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THE
# LARYNGOSCOPE.

VOL. LVIII FEBRUARY, 1948. No. 2

## PROBLEMS IN THE DIAGNOSIS AND THE EVALUATION OF TREATMENT OF CHRONIC TUBAL OBSTRUCTION.*†‡

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Chronic tubal obstruction does not present a uniform clinical picture by which it can be diagnosed. A review of some of our cases receiving radiation and other treatments for this condition and under the care of different otologists in the clinic reveals a wide variety of presenting complaints and clinical histories. Deafness when noticed was occasionally long-standing, but more commonly was intermittent and the associated symptoms of otalgia, fullness, tinnitus or recurring discharge were often recorded as the presenting complaint. In children no ear symptoms or complaint was noted in some of the cases with unilateral but definite middle ear changes. In some cases chronic nasal obstruction, with or without discharge was the only presenting complaint. Improvement or disappearance of symptoms during the summer months was often reported and observed. Improvement in number and severity of attacks was noted in children as they grew older. Practically all the children diagnosed and treated for tubal obstruction in the group reviewed for this report were under 13 years of age.

*From the Division of Otolaryngology, The University of Chicago.

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In this group diagnosed and treated for chronic tubal obstruction the nasopharyngeal examination revealed a wide variety of findings such as large adenoid, lymphoid tissue throughout the vault, enlargement of the Eustachian cushion, narrowing of the Eustachian tube orifice, lymphoid tissue over the orifice, general obliteration of the normal relations about the tube and Rosenmüller's fossa, as in carcinoma or lymphosarcoma, and no visible abnormality of the ostium, torus, Rosenmüller's fossa or vault (see Figs 1 and 2). No constant

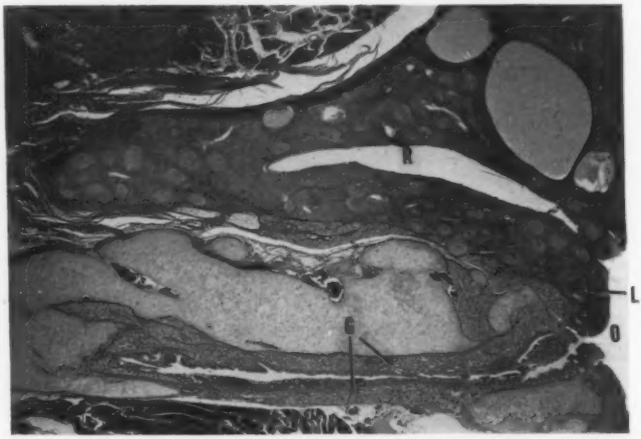


Fig. 1. Section through mouth of tube (O) and Rosenmüller's fossa (R). Note the large number of glands (G) along the tube and the lymphoid tissue in Rosenmüller's fossa, on the torus (L) and at the opening of the tube.

typical findings in the nasopharynx were reported in these cases, so that a uniform diagnosis solely on the basis of the nasopharyngeal picture does not seem likely. Conversely, a negative ear history with normal drum and audiogram was commonly seen in children with varying amounts of lymphoid tissue — even when the amount was large enough to cause obstructive nasal symptoms or where lymphoid tissue appeared to encroach upon the tube. Ear symptoms could not

regularly be predicted on the basis of the nasopharyngeal examination alone.

Auditory functional tests in this group usually revealed hearing loss. Where careful tests were done, including air and bone conduction curves, fork and monochord test, the hearing loss was conduction in type. High frequencies were

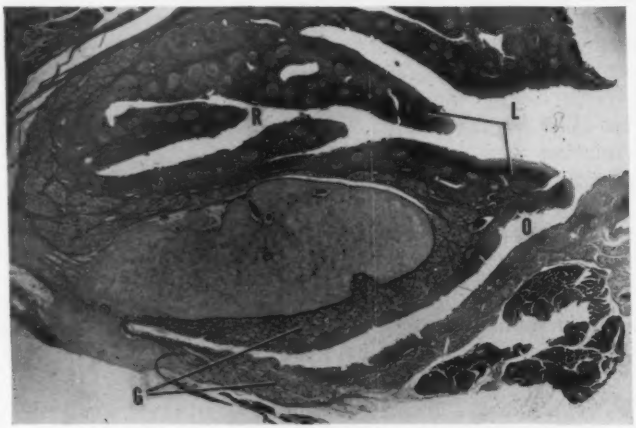


Fig. 2. Shows tube lined by glands (G), Rosenmüller's fossa (R) containing large amount of lymphoid tissue (L) continuing over the torus at the opening of the tube (O).

heard better by bone conduction than by air conduction when tested with the monochord. Often hearing loss fluctuated — with observed periods of good function especially during the summer, followed by varying periods of loss sometimes with symptoms pointing to a period of acute exacerbation. In the depressed auditory thresholds in this group no single type of curve was typical. Audiograms showing low tone loss predominating, flat depression throughout the frequency range tested, and high tone loss predominating were observed. The diagnosis of chronic tubal obstruction was, therefore, not associated with any single type of threshold curve. In this

whole group, however, definite improvement in the threshold immediately after inflation was commonly demonstrated during the period when the ears were actively involved. This was perhaps the most uniform observation with respect to auditory function reported in this group of patients diagnosed and treated for chronic obstruction of the tube. The resultant improvement in the audiogram was not maintained for over a few days at the most; therefore, in this group of patients the finding of a real, demonstrable sudden improvement in the threshold curve after inflation was associated with the diagnosis of chronic tubal obstruction.

No other finding in the nose and throat showed a significant correlation with the diagnosis of chronic tubal obstruction except allergy. Some manifestation or sign of an allergic disturbance was found on examination or in the history in a number of these patients.

The ear findings in this group were widely varied, but some change in the drum was always reported. The terms used to describe abnormality in the drum include retraction, pars tensa, Shrapnell's, or both; dullness, varied degrees and shades of reddening of the drum, fluid lines behind the drum; chalky, thin line, replacing the normal appearance of the malleus handle with change in the color of the drum, and indicative of a middle ear filled with fluid; and thickening of the drum. The diagnosis of chronic tubal obstruction in this series of cases was, therefore, uniformly associated with some reported abnormality in the appearance of the drum; however, no single drum picture was common to this group. The change in the appearance of the malleus indicative of a middle ear completely filled with fluid was perhaps the most common description in this group. After inflating such an ear, fluid lines were often observed, usually behind the anterior half of the drum. The term used here to describe the pathology associated with the presence of fluid in the middle ear is exudative catarrh. It is probably synonymous with the term secretory otitis used by others. In addition to changes produced by inflation,

myringotomy with recovery of fluid confirmed the diagnosis in some of the cases.

It is evident that the clinical diagnosis of chronic tubal obstruction is based on a variety of clinical pictures and nasopharyngeal findings and findings of a variety of secondary anatomical and functional changes commonly considered as resulting from tubal obstruction. The specific clinical pathological entity of chronic tubal obstruction is, therefore, not too clearly defined, and differences of opinion as to the diagnosis are, therefore, common.

It is understandable why many other examinations have been carried out to help remove the ambiguity of this condition. Earlier accounts of this abnormality of Eustachian tube function carefully describe changes in the auscultated sound of inflation of the tube with a Eustachian catheter. The bougie was also used to assess patency of the tube. Long experience with the above methods indicated their limitations. In recent years more physiological tests have been proposed to help in recognizing inadequate tubal function. The interest in this problem was reawakened by the problem of Eustachian tube failure in military personnel engaged in some types of military operations. The resistance of the tube during the act of swallowing was measured by Zollner[1] with a specially devised apparatus. This gives useful information when correlated with other findings.[2] The presence of reduced pressure in the middle ear, considered to be a manifestation of tubal obstruction, was recognized and measured by Van Dishoeck[3] with an apparatus he called the pneumophone. More specific and special tests of adequate tubal function were made in military personnel exposed to large, sudden changes in atmospheric pressure. In these cases no objective findings, including those obtained with a nasopharyngoscope, could predict failure of the tube according to Shilling.[4] It is important to point out that the latter tests are concerned with special conditions that do not necessarily reflect the adequacy of the tube for normal, long-standing ventilation of the middle ear at ground level. The middle ear changes due to acute failure of

the tube to transmit rapidly large pressure changes are well known and relatively easy to explain on the basis of the large negative pressures suddenly developed in the middle ear.

The rôle of negative pressure in the production of middle ear changes with chronic tubal obstruction is not so clear under ordinary conditions. Indeed, the existence of such a negative pressure in the middle ear is questioned by some.[5] The concept of a "hydrops exvacuo" to explain the formation of fluid in the middle ear is also questioned. The chemical examination of this fluid by Claus[6] did not indicate a transudate. The lack of organisms in the fluid is thought by some to indicate a virus infection. With the pneumophone it is possible to obtain indirect evidence of the existence of a negative pressure in the middle ear. The amount of this negative pressure is relatively small, not exceeding about 50 cm. of water. It is considered that with greater negative pressure, conditions are favorable for the escape of serum from the capillary beds into the middle ear and mastoid air cells. The oxygen in the air of the middle ear is at a greater partial pressure than that in the blood of the veins and capillary bed, and partial absorption of this oxygen in a closed middle ear is considered as the principal mechanism for the overall reduction of pressure. That such a selective absorption can take place is shown by periodic analysis of the gases in a pneumothorax and is suggested by the observations in fliers breathing oxygen for a prolonged period of high altitude flight.[7] In the latter experiment the middle ear may become filled with air gases, composed largely of oxygen. Several hours after return to ground level a sense of pressure develops and serum may fill some of these middle ears. This is explained by the rapid, selective absorption of this oxygen in the middle ear. The resultant development of negative pressure is caused by failure of normal mechanisms to provide a rapid exchange through the tube; furthermore, the air introduced by Politzerization in an ordinary case of exudative catarrh may be quite rapidly absorbed. In a few minutes the produced fluid line may be seen to have risen or to have disappeared.

Nitrogen gas is absorbed more slowly by the middle ear mucous membrane, according to Van Dishoeck.

Further evidence of the existence of negative pressure in the middle ear is sometimes obtained when doing a myringotomy in preparation for blowing out the contained fluid. A fine stream of air bubbles starting at the incision and rising through the fluid indicates the flow of air from the external canal into the middle ear through the perforation. When the ear becomes completely filled with fluid, the pneumophone test does not indicate negative pressure. The findings with the pneumophone in this especially important manifestation of tubal obstruction is that of a positive Gellé test. There is no change in loudness of the delivered sound with moderate changes of positive or negative pressure. If one succeeds in getting even a little air into such an ear by inflation, negative pneumophone readings, suggesting tubal obstruction, may sometimes be obtained along with an improvement of auditory function.

Once fluid has filled the middle ear, clinical observation indicates that its complete replacement by air takes about two weeks even where normal tubal function may be assumed. Indeed, the normal air exchange between the middle ear and the nasopharynx is probably very slow. Guergay[8] has shown, and it is easy to verify, that the normal tube does not open with each act of swallowing but that the tube may remain closed for long periods of time each day; the degree of opening varies also. Observation with the nasopharyngoscope reveals that the lumen of the tube at this point is open, and that it increases in size during actual or simulated phonation of vowels and during movement of the mandible as well as during swallowing. This does not indicate, however, that the lumen of the tube is normally patent throughout or that it is opened to the middle ear by the above procedures. The criterion for adequate tubal opening is transmission of sound waves. Using a sound source at the nose, auscultation of the ear reveals that the tubal movements associated with phonation are not adequate for opening the middle ear. Tubal reac-

tions associated with jaw movement are occasionally successful in transmitting sound. The act of swallowing seems to be the only physiological, and the most successful, way to open the middle ear. Conversely, swelling of the soft tissues at the tubal orifice with narrowing of its lumen can be produced by compression of the jugular vein in the neck. Even when the tube opens, physical laws would suggest that only a small fraction of the middle ear air is replaced. A 50 per cent exchange of the middle ear air molecules in the presence of equal pressures may require continuity through an open Eustachian tube with outside air for 30 minutes. It is not known how long the Eustachian tube must be completely closed under ordinary conditions before negative pressure develops or fluid appears in the middle ear. The fate of the different gas molecules in a closed middle ear and the factors responsible for effusion are obscure. Gas analysis of a pneumothorax indicates that there is a selective drop in oxygen tension and that this is rapid at first and then proceeds at a slower rate. A pleural effusion reduces the rate of both oxygen and nitrogen absorption. A partial physiological obstruction with prolonged negative pressure in the middle ear is also considered possible. It is suggested by pneumophone tests and is explained by Dishoeck on the basis of the sucking power of this negative pressure being only great enough to momentarily overcome the partial obstruction during the act of swallowing.

Clinically, we see patients who have fluid in the ear continually for months, and even years, and others whose ear fills with fluid for a few weeks only, with an acute infectious or allergic reaction of the upper respiratory mucous membrane. The conducting mechanism may be restored to normal function even after a period of years of continued presence of fluid in the middle ear. In one of my cases, normal function returned after seven years when the ear became normally areated. Successful attempts at restoring normal tubal function is well rewarded in this type of ear pathology. The type of process characterized by recurrent exudative catarrh may also be reversible; however, another group in which recurrent

suppurative otitis is seen may, or may not, be due to chronic tubal obstruction and may have irreversible middle ear damage. Prolonged tubal obstruction with or without exudative catarrh may also lead to irreversible changes in the conduction mechanism as a result of prolonged negative pressure in the middle ear. Various degrees of chronic retraction of Shrapnell's or the pars tensa might be explained in this way

Fig. 3. Eardrum of a fresh cadaver specimen showing area and degree of retraction of Shrapnell's membrane **(arrow)** and the radial fibres in the pars tensa. The irreversible retraction of the pars flaccida may be the result of long-standing negative pressure in the middle ear secondary to tubal obstruction.

(see Fig. 3). These irreversible changes may remain even after the tube is again restored to normal function.

The evaluation of therapeutic methods directed towards the correction of chronic tubal obstruction is again based on secondary changes in the audiogram and secondary changes in the conduction apparatus as observed through the external canal, or changes in the nasopharynx. Where inflation of the tube can be carried out, the amount of permanent hearing

improvement that one can expect with restoration of normal tubal function can usually be correlated with the amount of immediate improvements after inflation — as demonstrated with the audiogram, for instance; however, one exception at least must be pointed out in this relationship. Long-standing irreversible connective tissue changes about the conducting mechanism may result in conduction loss that may be momentarily improved by inflation. Indeed, these changes may be associated with a now normally functioning tube. The improvement obtained is explained by assuming that the stiffness factor of the conducting elements is restored towards the normal value by the positive pressure trapped in the middle ear.[9] The normal tube, at rest, will allow up to 15 mm. Hg. of positive pressure to exist in the middle ear. With a normal tube this positive pressure created by inflation disappears immediately upon swallowing — with the resultant immediate loss in the hearing improvement. In the obstructed tube this positive pressure may be retained in the middle ear for a longer period. Failure to deflate the ear by Toynbee's maneuver also suggests tubal obstruction. Long-standing changes in the ear and in the hearing is a better base line from which to assess therapeutic methods than the intermittent relatively short episodes of change for which therapy was often instituted in the group analyzed in this report.

In reviewing our experience perhaps one of the most clear-cut clinical pictures of chronic tubal obstruction where therapy can be assessed is in carcinoma of the nasopharynx.[10] A unilateral invasion and occlusion of the tube is often an early complication (see Fig. 4). The typical drum picture of an exudative catarrh with complete filling of the middle ear and mastoid air spaces and the resultant change in threshold curve may be completely reversed even after many months by radiation therapy. Corresponding definite changes in the nasopharynx are, of course, easily visualized. External radiation delivered daily for about one month is used in these cases with a total depth dose throughout the entire tubal area of about 5,000 R.

While carcinoma is a rare cause for tubal obstruction, it serves as a reminder that any of the tissue elements of the normal tube may be involved to produce tubal obstruction,

Fig. 4. Section through middle ear in a case of exudative catarrh associated with carcinoma of the tube. Note the edema of the mucous membranes (M) and the prominent vessels in the submucosa of the promontory.

particularly in adults. Even the bony tube may be apparently affected in some cases of acromegaly, for instance.

The large fat pad in relation to the tube and the large mass of glandular elements opening along the lumen of the tube may be mentioned. These tissues are particularly resistant to radiation (see Fig. 5). The glandular and lymphoid tis-

sues at the mouth of the tube can enlarge temporarily in infectious and allergic reactions. The Eustachian fat pad and the secretory glands probably contribute to the normal closure of the tube since under certain conditions, suggesting a reduction in their size, signs of abnormal patency or of a continuously open tube develop.[11] Reduction in the normal

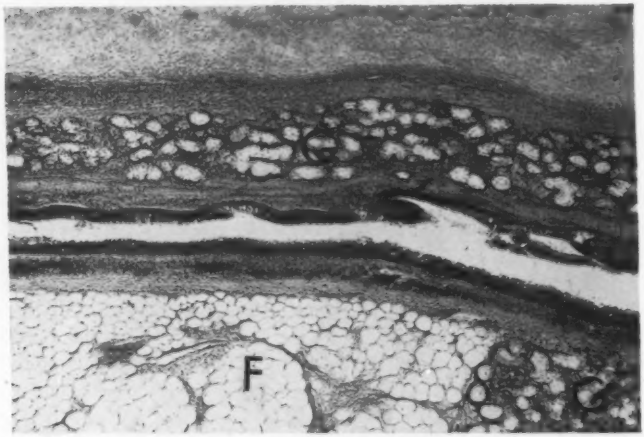


Fig. 5. Photomicrograph through cartilaginous portion of the tube showing the large amount of fat and glandular elements along the walls of the tube. These tissue elements are probably important in tubal function and are particularly resistant to radiation.

fat pad is assumed when abnormal patency develops in wasting disease. Reduction in the activity and volume of the glandular bed of the tube may be assumed to occur along with more easily recognizable changes in the nasal mucous membrane in cases of trigeminal neuralgia subjected to section of the Vth nerve and in massively radiated carcinomas of the nasopharynx. Lymphoid tissue may obstruct where deep in the tube (see Fig. 6) at the torus or in Rosenmüller's fossa. There is very little postmortem evidence to definitely confirm these clinical impressions, and conversely Polvogt and Babb[12] point out the wide variations in the histological appearance

of the tube from cases known to have had good hearing. In children, lymphoid tissue is the most likely element causing obstruction, but inflammation and allergic changes in the mass of secretory glandular elements within the tube are also to be remembered along with the fact that transient increases

Fig. 6. Section through the Eustachian tube above the torus showing mucous membrane folds and the subepithelial lymphoid tissue (L) which may influence tubal function.

in the size of the lymphoid tissue itself and the glandular elements occurs with inflammation and allergic reaction and perhaps in response to endocrine stimulation.

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# ANTONIO VALSALVA — PIONEER IN APPLIED ANATOMY — 1666-1723.

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The average ear specialist, familiar as he is with what is known as the Valsalva method, probably thinks of it as a method devised by some modern practitioner of his specialty; but Valsalva was neither modern nor was he an ear specialist. He lived about 250 years ago, long before the age of specialism.

He was professor of anatomy at the University of Bologna, in Italy, and although also a practitioner of medicine and surgery, he was primarily an anatomist; in fact, he was one of the most assiduous dissectors that ever existed. He began in youth and continued at it, day and night, almost to the end of his life.

As he devoted particular attention to the anatomy of the heart and the ear, it is natural that the two famous eponyms associated with his name should concern these two organs:

*Valsalva's Sinus* is the name applied to a pouch-like dilation of the aorta opposite each of the segments of the semilunar valves; also called the aortic sinus.

*Valsalva's Experiment, Maneuver, Method, or Test,* are different names applied to the same procedure, according to one's conception of the purpose for which it is done.

The procedure consists simply in making a strong expiratory blast while holding the nose and mouth tightly closed in order to make the air pass through the Eustachian tube into the cavity of the middle ear.

It was originally suggested by Valsalva as an effectual means of expelling pus from the tympanic cavity and so help

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the hearing ("Si eadem tuba forte clauditur, illico, ut ego comperi, ammitatur audibus." De aure humana tractatus, Bologna, 1704, Chap. V, p. 68). Later it was adopted as a method of treatment in cases of insufficient aeration of the middle ear as a result of tubal obstruction.

It is often resorted to by the patient of his own free will after he has learned that he may sometimes obtain temporary

relief in this manner. Otologists in general, however, advise against its indiscriminate use.

It is in fact an unphysiological procedure. Aeration of the middle ear is normally accomplished during the *opening* of the tube that takes place in the act of swallowing. The expiratory effort necessary to force air through *closed* tubes may cause a rise of blood pressure; besides, if the two tubes are unequally obstructed, the blast will operate stronger on the less obstructed and, therefore, the wrong side.

Valsalva's *test* is the Valsalva procedure employed for diagnostic purposes. With the examiner's eye on the illuminated drum membrane while the patient is inflating the tubes, valuable information may be obtained as to the mobility of the membrane or the presence of a small perforation.

Any harm done by its occasional cautious use for this purpose is deemed negligible.

There is probably no business or profession in which the son so often succeeds his father as in the profession of medicine.

Likewise, it may be said there is none in which the relationship between teacher and pupil is so often almost like a father and son relationship.

Reverence of the disciple in the healing art for the master who taught him is a tradition that dates back to the very beginning of the profession.

The famous Oath of Hippocrates, the Father of Medicine, who lived in the fifth century, B.C., about the time of Socrates, begins as follows:

"I swear by Apollo, etc., to reckon him who taught me this art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required, to look upon his offspring as on the same footing as my own brothers and to teach them the art if they wish to learn it, without fee or stipulation."

For many centuries in Europe this oath was administered to every medical student at the beginning of his terms, and it is even used in a modified form in some colleges today.

In spirit, at least, it has always in a measure prevailed. History of medicine shows that there have been wonderful examples of its influence in every country of the world, including our own.

In former days in England it was usual for a young man desiring to enter the medical profession to select a preceptor

who became, as it were, his especial guide, counselor and instructor in his preparatory studies.

He entered his household and became like one of his family, and often a mutual affection sprang up between them which lasted through life. Occasionally, it is true, this would not happen.

John Keats, who graduated in medicine and obtained a license to practice before becoming one of the world's greatest poets, could not get along with his preceptor, Surgeon Hammond. They quarreled, and Keats, who was in early life proud of his pugilistic prowess, came near, as he himself confessed, to exercising it upon the surgeon. We must, however, consider the case of Keats as only a conspicuous exception. He never liked medicine and so never entered into the spirit that pervades the profession. During the lecture hour he was always either scribbling poetry or looking out of the windows, watching the skies, the birds and the flowers.

The more frequent experience is well illustrated in the case of Edward Jenner, who, while a student, lived in the home of the great surgeon, John Hunter.

When young Jenner left London to become a country doctor in his native Gloucestershire, letters were continually passing between them — Jenner to ask advice about some of his difficult cases, Hunter not only to advise him about such matters, but also in his love affairs and his studies in natural history; and finally, when the young country doctor was on the trail of the great discovery that was to wipe the scourge of smallpox from the face of the earth, it was Hunter who encouraged him and urged him to verify his experiments.

Take the case of the famous Edinburgh surgeon, James Syme, and the young medico, Joseph Lister. Lister entered the household of Syme, became his hospital assistant and married his daughter. At a time when other surgeons were deriding what they called the silly antics of the young Quaker trying to destroy germs during operations, Syme took his

work seriously and was one of the first to help establish the great value of antiseptic surgery.

France furnished a somewhat similar example in the case of DeSault and Bichat.

When Xavier Bichat, the son of a country doctor, arrived in Paris, in the year 1793, DeSault was easily the most distinguished surgeon in Europe. Xavier was an easy-going, fun-loving student, but DeSault saw that he had talent. He invited him to come to live with him in his home and to assist him in the hospital and in his literary work. Xavier lived only to the age of 31, but before he died he made epoch-making advances in the science of pathology. The two men became such intimate associates and friends that you never see a picture of one without the other.

Turning to Germany, it is enough to point to Johannes Muller, an inspiring teacher and a man of great personal charm. No teacher ever had so many famous as well as devoted pupils. Among them were Schwan, Henle, von Kolliker, Virchow Du Bois Raymond and Helmholtz.

In the whole history of medicine, however, there is nowhere to be found the beautiful teacher-pupil relationship such as that which existed between the two great Italian doctors, Antonio Valsalva and his pupil, Giovanni Morgagni.

We could go back further and begin with Marcello Malpighi, who was the teacher of Valsalva, and continue forward a little further and include Antonio Scarpa, who was the pupil of Morgagni. These four great men, linked together in a teacher-pupil relationship, might be looked upon as a sort of apostolic succession in the hierarchy of medicine.

It is interesting to note that each is a doctor of eponymic fame. From Malpighi, we have the Malpighian corpuscles, from Valsalva the Valsalvian experiment, from Morgagni the Morgagni ventricle, from Scarpa the Scarpa's triangle.

Morgagni was 79 years of age when he published his famous work, "De Sedibus," which earned for him the title

of Father of Pathology. Why did he wait until so late in life? Was it not because he had devoted so much of the earlier years of his life collecting and editing the writings of his revered teacher, Valsalva? He spent 15 years in this labor of love. He began soon after Valsalva's death in 1723, and it was 1740 before his two-volume work was published under the title, "De Vita et Scriptorus Antonio Mariae Valsalva, Commentarium Editum cum hujus Operibus."

When he had completed this work he went into the country for recreation, and this visit marked the beginning of his own great book; for, according to his own story, he met on this occasion a young man who became so interested on hearing some of his autopsy experiences that he begged that after his return to the city he write to him and give him accounts of other cases. His "De Sedibus" consists of a series of letters to this unnamed correspondent.

Morgagni had unbounded admiration for his former teacher. To him, Valsalva was, in every respect, the paragon of excellence. He was not only one of the greatest anatomists, he was also a very able physician and skillful surgeon, but, above all, he was a man of noble character.

Morgagni pays great tribute to him for his discrimination in his anatomical studies, and he does not hesitate to acknowledge his indebtedness to him for that kind of pathological outlook for which he, himself, has gained such high renown.

Antonio Valsalva was born Feb. 6, 1666, in a little town in Romagna, then known as Cornelia, now as Imola, on the road from Bologna to the Adriatic.

He came of noble family on both sides of the house. His father's name was Pompeius Pini, but he took the name of Valsalva from an old castle located on the bank of a river nearby which for generations had been in the possession of the family.

His early instruction was at the hands of Jesuits, but when he was old enough he was sent to Bologna where he first

studied philosophy, mathematics and botany and later took up medicine. He was fortunate in having, as his professor of anatomy, Marcello Malpighi, who had gained fame for his pioneer studies in histology and, above all else, by his demonstration of the capillaries in the lung — a discovery which furnished the missing link in Harvey's theory of the circulation of the blood.

Valsalva became his favorite pupil and eventually his associate in his researches, and it was no doubt upon his recommendation that he became a member with him in the Royal Society of London.

He graduated cum laude in 1687, and in that same year he performed an experiment for which he received high praise from Morgagni. He removed the kidney of a dog, and the animal lived. This was probably the first case of a successful nephrectomy.

Valsalva perfected himself in other branches of learning, especially philosophy and chemistry, but his chief interest was in anatomy.

He was, Morgagni tells us, an indefatigable dissector; he would sometimes continue working almost through the whole night and very often against the advice of his friends, when he was evidently suffering from illness.

The anatomy of the ear had received attention from several well known Italian scientists — Vesalius to some extent, but more particularly from Eustachio and Fallopio. Valsalva was, however, not satisfied with what had been done, and he considered it a fruitful field of research. He set himself the task of a complete study of this organ. He spent 16 years at it, and he is said to have dissected 1,000 heads before publishing his results.

There were two contemporaries, also, who were devoting study to the same subject — Vreussins, of Montpelier, and Duverney, of Paris. The latter, several years before (1683),

had written what was said to be the first treatise on the subject.

Valsalva gave generous credit to these authors, but he went far beyond all of them. His "De Aure Humana" appeared in 1704, followed by several editions shortly thereafter. It was heralded as a landmark in anatomy, and it became a standard work for a full century.

We cannot give here a complete review of this classical treatise; we will content ourselves with citing some of its outstanding features.

It was in this treatise that we first hear of the organ of hearing being divided into its three parts: external, middle and internal, a scheme of division that has been adopted ever since. The author was the first anatomist to delineate the muscles of the auricle. This was because, as Politzer remarks, he was an unusually painstaking dissector and overlooked nothing.

He was the first to demonstrate with clarity the connection of the middle ear with contiguous structures. This was an accomplishment of great significance in the light of later developments in surgery. One could now understand how the mastoid became involved, and how it should be treated. He laid great stress, also, upon the relation between the middle ear and the cranial cavity. He made experiments by introducing colored fluid under pressure into the middle ear, the fluid appearing as a result, so he claimed, in the cranial cavity.

He was in error in his belief of the existence of direct connection under normal conditions, but his calling attention to the close relationship was a useful suggestion.

He believed that secretions of cerebral origin would drain into the tympanic cavity, and this idea led him into a false explanation of middle ear suppuration as a sequel of cerebral suppuration, when it should have been considered as the reverse.

The opinion expressed by Valsalva was that generally held.

It had been adopted by Fallopio and other authorities. It was a contemporary, Duverny, we believe, who first had the right idea of the relationship.

Valsalva was the first to recognize the importance of the Eustachian tube especially as a source of defective hearing, and to describe the muscles of the tube.

He originated a method of treating ear trouble by forcing air into the middle ear, by way of the tube — the Valsalva method, already described. He was the first to recognize the chain of ossicles as a medium for the transmission of sound waves, and he almost anticipated the Helmholtz theory of hearing when he describes the expansion of the auditory nerve as distributed in the form of zones for auditory perception; but the gem of the collection was his observation of stapes ankylosis and his recognition of it as the cause of deafness in a case which had come under his observation during life.

"One day on the cadaver of a deaf person I found the cause of the deafness. This membrane (covering the oval window) was ossified in such a way that the base of the stapes and the periphery of the oval window formed a solid piece and the stapes had become immobile."

This is the first case on record of typical pathology of otosclerosis, preceding by over 150 years the studies of Toynbee (1857) and Moos (1861), but another century had to elapse before a beginning could be said to be made in the way of correcting this observed cause of deafness.

In the year following the publication of his book, and no doubt chiefly because of it, Valsalva was appointed professor of anatomy at the Bologna University.

He thus became successor to Mundino, famous for his attempt to revive human dissection during the middle ages, and to Varolio (1543-1575), Aranzio (1530-1580) and Malpighi (1628-1694).

He was a worthy successor to these celebrated men, and in certain respects he added new glory to the chair. He deserves

distinction for being the first to wrest from the otherwise dull and dry science of anatomy, facts usable in the art of medicine. He advanced from mere descriptive anatomy to the rich field of applied anatomy. By applied anatomy we mean something more than pathological anatomy, which is the science of correlating the postmortem findings with clinical history of a patient.

In addition to the foregoing, observations in regard to the function of the organ laid bare by dissection, and useful suggestions with regard to medical and surgical treatment are components of applied anatomy.

Morgagni is universally regarded as the father of pathological anatomy, but it seems to have been from Valsalva, as he, himself, freely admits, that he received his first idea.

He tells us that it was the habit of his teacher before opening a cadaver to hazard a guess as to what organ he would find particularly diseased, which could mean nothing else than that he was in possession of some knowledge of the subject's clinical history and was striving to connect symptoms and pathology.

As striking examples of his achievement in this line, we need cite only two examples: *1.* his observation, sometimes called Valsalva's dictum, that paralysis in apoplexy is to be found on the side opposite the lesion in the brain, and *2.* his observation of stapes fixation in the case of deafness.

Valsalva did not dissect with the single purpose of charting anatomical conformations, but always with a mind directed toward the significance of what he observed.

In his "De Aure" he included many comments of this nature. It is true that some are erroneous, but nevertheless, as Politzer remarks, he "advanced principles of rational therapy which gave a new perspective and opened new roads for the progress of otology."

It must be recalled that although in his day some advances had been made in the anatomy and physiology of the organ

of hearing, therapeutics of its diseases were pitifully inadequate.

According to one author, a prescription for ear diseases in vogue during that period was as follows:

"Mix urine of a female donkey that has borne but once with that of a female wolf (or if unobtainable that of a white goat), warm, add a little oil of caraway, and use as ear drops."

Valsalva was a practicing physician and surgeon as well as an anatomist. Soon after his elevation to the professorship of anatomy, he received an appointment as physician to the Hospital of the Incurables. This position no doubt afforded him an excellent opportunity, on the one hand, to study clinical history in connection with postmortem findings; on the other, to make practical application medically and surgically of his superior anatomical knowledge.

According to Morgagni, his skill as an anatomist was well matched with that in surgery. He employed ligation in place of the cautery, and he is credited with having made a notable improvement in the method of treating aneurysm. He attained a considerable reputation as an able physician, and was frequently called to other cities in and even outside of Italy for consultations. He was also sometimes called upon by the state to advise in regard to the prevention of epidemics and other matters of public hygiene.

We do not know whether it was in connection with government duties or in private practice, but in one or the other capacities he seems to have had occasion to care for persons of unsound mind; and it was in this connection that he advanced revolutionary methods of treatment such as entitle him to renown, and for which he probably would have received greater recognition were it not for his overshadowing achievements in anatomy.

Garrison, in his History of Medicine, states that the noble-minded Phillippe Pinel (1745-1826) "stands high in medical history as the first to treat the insane in a humane manner.

At the risk of his own life and liberty, he initiated the reforms of striking off their chains, placing them in hospitals under lenient physicians and doing away with the abuses of drugging and blood-letting to which they were subjected."

It seems, however, that Valsalva had advocated and practiced similar treatment as much as a century before the days of Pinel. He refused to subscribed to the then orthodox instruction "to chain the mad and repress their rage." He advocated humane methods in the treatment of this unfortunate class, and he ordered the attendants in charge to employ gentleness and kindness in place of cruelty and coercion.

From all accounts Valsalva was a man of great kindness and benevolence, and naturally he had many friends. His house was always open to persons in need, and he gave his services without charge to patients unable to pay. He was married in 1710 to Helena Linia, and he had two sons and three daughters. His two sons predeceased him.

Valsalva either did not have a thoroughly healthy constitution, or he impaired it by overwork, as he lived only to the age of 59.

Morgagni, who accompanied him in 1721 on a trip to Venice, noticed at that time an unnatural thickness in his speech and became so concerned that he spoke to his friends about it. Two years later, on Feb. 2, 1723, he died following an attack of apoplexy.

Morgagni has left for us a vivid pen-picture of his personal appearance.

"He had a high and broad forehead, black and very lively eyes, a regular nose, a small mouth, crimson lips; his face was calm but not without gravity; he was not of large size, but of fine figure and of strength adapted to endure hard labors. His hand was steady and ready for the most delicate work, and his body was agile to such a degree that even in the last six or seven years of life he was not overtaxed by fat."

Though Valsalva, himself, is but little known, his name is

well known by reason of its incorporation in widely used eponyms.

What is his rightful place in medical history?

According to Morgagni "anyone who esteems talent and knowledge of things, and who sees how Valsalva augmented his natural talents by unending assiduous labor, reaching eminence alike in anatomy, medicine and surgery, cannot fail to assign to him a place unsurpassed in his era."

The Italian historian, Artura Castiglini, sums up his estimate by speaking of him as a "distinguished anatomist, a profound philosopher, an untiring investigator, a keen clinician and an eloquent teacher."

To this we should like to add one more tribute: namely, that his life in all its aspects presents an inspiring example of the noblest traditions associated with the art of healing, as a pupil, as a teacher and as a practitioner.

# LIPREADING FOR THE DEAF AND HARD OF HEARING: ITS PLACE IN OTOLOGIC THERAPY.*

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In the past, lipreading for the deaf and hard of hearing has been regarded almost exclusively as a means of rehabilitating the acoustically handicapped, to be resorted to only after otological treatment had failed to restore adequate auditory function. This cautious attitude was justifiable while the teaching of lipreading was being developed through laborious experimentation, combining basic research and patient application of improved methods — a process to which otologists could, of necessity, contribute only little; but the acoustically impaired require rehabilitation as well as therapy, and the time has come to combine the various specialized efforts into an all-inclusive plan for the protection of persons with failing hearing against the physical, mental and social hazards which an appreciable hearing loss is likely to entail.

Decisive steps in that direction have been undertaken within the past years. The teaching of lipreading has almost acquired the status of a separate science, and a profession employing specialized skills has been developed. Under medical supervision this technique can now safely be included into a coordinated program of care for the acoustically impaired. In rehabilitation clinics, as for instance in Reading, Pa.,[101] and in the three Army centers for the treatment of deafness — especially in Deshon General Hospital[99,100] — otological diagnosis and therapy have been merged into an integrated system with complete facilities for the rehabilitation of individuals with hearing defects, using in many instances the group therapy method.[72] Great benefit can derive from such a compre-

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hensive program of medical, educational, psychological and vocational rehabilitation, and it is gratifying to note that many communities and states as well as the medical profession as a whole are working towards the establishment of a sufficient numbers of centers in which these various services can be combined.[68] As this complex procedure depends upon contributions from a wide variety of specialized fields, hearing clinics would obviously profit by connection with a university where the cooperation of otologists, psychologists, linguists, social workers, psychiatric social workers, etc., is readily available and where, furthermore, the medical treatment of patients can be combined with research and teaching.

While the present tendencies are very promising, and worthy of sustained effort, only a few hearing clinics are yet able to provide coordinated rehabilitation and the responsibility for aid to the deaf and hard of hearing still rests primarily with the practiced otologist. The great progress made in the field of lipreading will, therefore, prove of immediate benefit to the deaf and hard of hearing only if this auxiliary science is integrated into the standard otological treatment. To this end, the otologist will need to be thoroughly acquainted with the possibilities and limitations of lipreading, in order to understand that with the inclusion of this specialized procedure, his task will become easier — and not more complicated, as it might appear at first glance — while at the same time a great service will be rendered to the patient.

At first a current misunderstanding has to be dispelled: for the purpose of starting his patient on the road to lipreading and to supervise his progress, the otologist does not have to be a specialist in this difficult art. Lipreading should be regarded as an auxiliary branch of medicine — comparable, for instance, to roentgenography or physical therapy — where all the expert detail can safely be entrusted to a skilled technician, and where the part of the attending physician is restricted to coordinating the results obtained with his diagnosis and the prescribed course of therapy.

Lipreading proceeds from the observation that in producing

the different sounds which together constitute human speech, the mouth has to assume for a very short period of time one of a number of typical positions. In the words of Dr. John Bulwer (1648), it is "the subtle art which may enable one with an observant eye to hear what any man speaks by the moving of his lips";[84] yet, this statement has upon closer investigation proven correct in only a fraction of cases.

In the English language, more than 50 per cent of all speech elements are either invisible or indistinguishable (homophonous).[64] While the differences between vowels are visible to varying degrees, the distinction of consonants meets much greater obstacles, especially in the case of the labials;[46] furthermore, in the ordinary flow of language, the individual speech elements have a duration of only one-thirteenth of a second.[91] Obviously, therefore, visual perception of the spoken language cannot proceed from the recognition of individual letters, but must rather be based on the observation of muscular movements as one set of clues which, in combination with indications derived from other observations, leads to the understanding of speech.[79]

To a certain degree, even persons of normal hearing will resort to lipreading without, however, being conscious of this fact: common experience proves that it is more tiring to follow a lecture if the face of the speaker is hidden and most persons try, therefore, to seat themselves so that they can see his face. The part played by vision in the recognition of speech among normal persons not trained in lipreading has been demonstrated experimentally.[16] Impulses coming in over the second cranial nerve may have precedence over those entering over the VIIIth nerve,[62] but this applies in practical life only if vision is concentrated on an object not related to concomitant hearing. Whenever visual and acoustic perception are coordinated, they will undoubtedly reinforce each other. In accordance with nature's law of compensation, deafness increases the receptive capacities of the other senses, as has been pointed out by an otologist who had become deafened himself.[3] "Natural lipreading" as it has been variously re-

ported[11,195] is the outcome of increased coordination of perceptive processes in hard-of-hearing persons and, in cases of complete deafness, it indicates an unusual degree of interest for the other individual rather than for the deaf person himself.

Proficient lipreading, it may, therefore, be concluded, entails the development of many more faculties than merely the one of automatically correlating diverse lip positions with sound impressions or, in the profoundly deaf, with other pictures representing letters, words or objects. These other elements are of such great importance that many individuals, especially children, become efficient lipreaders without any kind of analytical practice.[25] It has been stated that speech recognition requires at least as much exercise of the intelligence as of the visual faculty.[21] Every effort should be made in order to conserve the vision of a deaf or hard-of-hearing individual,[51] especially as the stigmata responsible for deafness are frequently found to be reflected in pathological processes involving the eyes.[23] A changed diet, and institution of vitamin therapy, on the other hand, may not only aid attentional concentration through increased cerebration, but also produce a more favorable psychological attitude in the student of lipreading, by creating in him a general feeling of improved health.[37]

All authors agree on the need for psychological and frequently even psychiatric preparation[36] of the patient, before beginning the formal study of lipreading; accordingly, at the start of the rehabilitation program of the Army, the deafened soldier is introduced to a young lady who has made a very excellent adjustment to a severe hearing loss.[100] In some cases, the patient is reluctant to admit his deafness and attempts to dissimulate.[26] Such psychologic peculiarities can sometimes induce an inhibition against the study of lipreading, strong enough to require the assistance of a medical-social worker.[97] In one of the Army hospitals, functional trauma contributing to psychogenic deafness in varying degrees was found to be present in 30 per cent of all patients with a

demonstrable hearing defect.[12] It was possible to prove experimentally that the spontaneous lipreading ability of persons without special training is directly related to certain personality characteristics.[14] In children who, after the acquisition of speech, have become totally or partially deafened as the result of illness, a severe upset of the whole mental and physical equilibrium has to be regarded as the rule, and it may take two or three years before adjustment to the changed conditions can be achieved.[89]

Proficiency in lipreading does not necessarily seem to depend on a high degree of intelligence: it has been reported that even persons of apparently slow intellect were able to become accomplished lipreaders within a reasonable period of time.[19] An individual's vocabulary, and the extent of his general knowledge, appear to be more important than his intellectual level and analytical ability.[101] Motor organization plays an important part, and pupils who have a natural facility to follow a rhythm will also prove to be better lipreaders.[46] This fact is of great importance as most deaf children enjoy singing, are excellent dancers and love music.[31] Some patients are helped in the perception of speech by feeling the vibrations, other than acoustically, as they emanate from the speaker, while at the same time observing his face.[20] This surprising fact is explained by a deaf author, who makes the significant observation that every part of the body gradually acquires the quality of a sounding board.[92] The increased awareness of rhythmical elements again permits the eye of the trained lipreader to grasp accent and emphasis through changes in the timing of words which may measure but a fraction of a second. The smooth, unhurried rhythmic flow of a lecture may be as pleasureful to the eye of the deaf lipreader as it is to the hearing ear.[25]

A more highly developed sense of language and the ability of abstract thinking have been named as requirements for greater lipreading facility;[46] however, it would seem that language is not the only vehicle of organized conceptual thought, and that in the deaf "thinking in meaning" is of far greater

significance than "thinking in words."[22] This different approach to thought may account for several characteristic features in the style of the deaf: the relative lack of precision, the more pronounced use of unrelated language units and the comparative rigidity of structure.[45]

There seems to exist a basic dissimilarity in the difficulties encountered by students of lipreading: congenitally deaf children differ from adventitiously deafened adults and from the hard of hearing of any age.[89] When lipreading is correctly taught to congenitally deaf children, it amounts to a mental and emotional stimulus of the first order, and in a great number of cases the child develops into an entirely normal, well balanced and intelligent adult. While the first steps toward that end require great patience, educational skill and specialized knowledge, the later development will prove less difficult and the ability of understanding language as well as the faculty of abstract thought seem to result in a natural sequence.[25,103]

The situation is entirely different in cases of adventitiously deafened and hard-of-hearing individuals — the class of patients which the practicing otologist encounters most frequently. As a rule, the older an individual the more difficult will it prove for him to acquire the skill of lipreading.[18] The immediate conclusion is, of course, that training in this art — whenever it is indicated — should be instituted at the earliest possible moment; moreover, this observation points at another important factor: it might be assumed that the merely hard of hearing or the adventitiously deaf are at a great advantage as compared with born deaf individuals. They may be able to fall back upon residual hearing, and doubtless have a far greater fund to draw upon for contextual understanding; they have a better command of language, and in some instances the faculty of abstract thinking has been developed. In actual fact, however, such patients are often at a great disadvantage: the incomparably much wider basis on which they are able to approach the problem of deafness in general, and that of lipreading in particular, counts little if the person cannot

adjust in a productive manner to the newly created situation. While various methods have been evolved to stimulate the mental development of congenitally deaf children or of those who have become deafened in earliest childhood, by teaching them how to read[76] or by instruction in arithmetic[21] and through various methods of presenting contextual material, especially by the use of Life Situation Motion Pictures,[78] it seems there is no equally promising approach in those cases where the patient became deaf or hard of hearing in later life.

It is true that isolated instances have been reported in which oncoming deafness acted as a mental stimulus and the threat of loneliness and unemployment motivated the individual to summon all his remaining powers; but as a rule, and especially in the adult, nervous tension seems to accompany the total or partial loss of sound perception. From an Army hospital it has been reported that two patients who had no measured amount of residual hearing and, therefore, were able to profit from any kind of hearing aid, received considerable alleviation of their nervous tension when a bone conduction receiver was strapped to their wrists or held between the fingertips, thus apparently conveying to a small degree the quality and intensity of sound.[99] It is evident that as long as traumatic shock or a highly emotional, self-centered attitude prevail, the patient will be unable to reconcile himself to the fact that he will perceive only part of a sentence by means of lipreading, and has to reconstruct the rest through mental adaptation.[25] This method of listening more to the sense of an entire utterance than to the single words of which it is composed is a common, though unconscious, habit among persons of normal hearing; but when, as an automatic primary function, it must serve as the permanent basis of communication with the outside world, increased concentration, great interest in one's surroundings, and a considerable exertion of mental effort are required.

One reason why lipreading instruction is often more successful with young children than with adults may be traced to the fact that the lipreader must focus his entire attention

on the speaker's face under exclusion of anything else which may be going on at the same time. While in normal hearing the word is perceived in a homogenous setting with concomitant acoustic and visual impressions, the lipreader is necessarily unaware of other phenomena, and not only of those of an auditory nature. This restriction will prove disturbing to the deaf and hard-of-hearing adult, but the young child, unable to make a comparison, grows up into a world of a different structure than that of normally hearing people, a world in which the word exists exclusively in a person-to-person relation. Lipreading skill, therefore, has to be developed along different lines — not only in basic classroom exercises, but also in its application to vocational use, extracurricular activities, and social life in general.[80] Accordingly, the lipreading syllabus compiled at the Army's Hoff General Hospital included not only material pertaining to the military experiences of the patients but also relating to the social, vocational, economic, political and technical fields.[12]

Even though lipreading substitutes signs for that which reaches the hearing person as sound, it is decidedly preferable to finger spelling. It has been pointed out that the principles of teaching as well as of recognizing finger spelling are similar to those of lipreading;[21] but there can be no doubt that lipreading is more closely linked to speech than finger spelling.[25] Most important is the fact that the sign-language, which is a closed system, separates the deaf person from his hearing fellows,[103] while lipreading constitutes a passive adjunct correlated to the spoken word as the active element in the system. Lipreading as taught to young children permits acquisition of speech during the normal period of most rapid linguistic development, up to the age of five[25] or seven years.[105] It has been suggested that the language-appreciating and the language-producing centers are intimately related, and that lipreading as a language by sight — with or without help of a hearing aid — may develop innate tendencies before the plastic brain period comes to an end, approximately when the child passes the age of seven;[103] therefore, the step out of the

gesture language — which belongs ontogenetically as well as phylogenetically to the prespeech era — should be undertaken as early as possible in order to safeguard normal development of faculties and personality; and one of the tools by which a child may acquire language is the art of lipreading.[89]

It has been shown that the introduction of lipreading has a decided influence on the intelligence quotient as well as on the course of character problems in children of school age.[50] Lipreading will also remove a false sense of shame and center attention on achievement.[101] The burden of deafness can thus be lessened, and compensatory factors are stimulated within the personality.[96]

In patients with only a slight hearing loss, lipreading is preferable to the use of mechanical aids.[19] This is especially true if the disease is of a chronic character and must be expected to grow progressively more severe. There exists no standard set of rules by which the percentage of hearing loss alone might be able to determine the advisability of lipreading instruction;[9] furthermore, it is well understood that a person's ability to hear speech cannot be adequately measured by mere audiometric readings alone, but requires more specific tests. Lipreading is regarded as absolutely essential for patients who are deaf to sound above the frequency of 1,000 cycles,[25] or for those in whom there remains only a slight residue of hearing within the speech range.[82] On the basis of audiometric tests, the advisability of lipreading instruction according to the measurable degree of hearing loss has been established as follows: with a hearing loss of 20 to 30 db, lipreading is often advisable; a hearing loss of 30 to 40 db always requires lipreading instruction, which in selected cases should be combined with the use of a hearing aid; for a loss of between 40 and 70 db, the use of a hearing aid as well as lipreading is considered necessary; in cases of profound deafness — loss of more than 70 db — lipreading should always be instituted, while a hearing aid should be prescribed only in those cases where a sufficient amount of serviceable residual hearing has been ascertained.[42] From this tabulation it be-

comes clear that of the two measures, lipreading is more widely useful in the rehabilitation of acoustically handicapped persons, and this order of preference is especially valid as its authors are unequivocally in favor of the use of hearing aids.

In practical application, lipreading and mechanical hearing aids supplement each other rather than compete for the same remedial effect. For instance, a program of about 40 lipreading lessons has been suggested before a hearing aid is provided to adult patients,[101] but this sequence must be modified in the treatment of children. When individuals have depended on lipreading for the understanding of speech up to the age of 12 years, they will experience great difficulty in shifting their attention from the eye to the ear and to reconstruct their auditory images; after children have reached the age of 15, such a correction should be attempted only under exceptional conditions.[42] When younger children, who had first been trained in lipreading classes, were changed to lipreading in conjunction with earphones, individual progress was retarded in all cases, and in some instances to such a degree that the children had to be returned to lipreading alone.[54] On the other hand, the training of residual hearing, possibly with the help of a mechanical aid, is an important means of improving lipreading,[14] and it has been rightly concluded that lipreading and auricular training are closely related.[44] This finding is supported by the fact that in children with only a small amount of residual hearing the auricular method of teaching speech (using mechanical aids in addition to lipreading) has proved superior to the oral method (using exclusively lipreading) with regard to the quality of speech — especially expression and articulation — as well as the potentialities of continued improvement.[54]

It must, therefore, be concluded that the decision of the best course to take — whether it should be lipreading alone, or in combination with a hearing aid — has to be made immediately at the start of rehabilitation; this decision which may determine the whole future life of the patient will have to be made by the otologist who, in order to come to a wise judgment of

the different factors involved, will have to consult with specialists in the various branches of rehabilitation for the acoustically handicapped. Not always will the best course to follow be the combination of lipreading with the use of a mechanical aid; it has been pointed out that instruction in lipreading alone can prove more valuable than any mechanical aid could ever be. It will develop a skill which will remain a permanent possession requiring no cost of upkeep or of renewal, and which will never deteriorate in usefulness.[71] At the same time it should be remembered that practice in the use of a mechanical aid also requires a period of adjustment,[34,93] and that rehabilitation by means of a hearing aid is not possible in all cases.[55] It is an interesting observation that hearing aids will fail to produce a beneficial effect in exactly the same group of patients (extreme nervousness, unwillingness to undergo a learning period, undue consciousness of their disability)[56] in which lipreading instruction faces its greatest obstacles.

Not all deaf children are able to learn lipreading,[51] even though in some cases it may take several years to bring this fact into full evidence.[80] In children, training in lipreading requires a period of from one to two years,[33] providing a minimum of two weekly lessons of one hour's duration is adhered to.[74] In adults, at least one year's study seems to be required in order to attain any real degree of proficiency, and it should be kept in mind that more than two years of instruction have proved to be unproductive.[57] Estimates of the required period of instruction vary[73] because in each case the patient presents an individual problem demanding its own specific solution. An employee who was threatened with the loss of his job was able to master lipreading within three months' time.[24] The average lipreading course for the rehabilitation of aural casualties in the First World War required only 2.7 months.[6] During the Second World War the deafened were generally able to master the rudiments of lipreading within six to eight weeks[48] in a basic course taught at the hospital.[67]

Acquisition of lipreading cannot be considered as an isolated problem, but is rather an integral part of the rehabilitation and readjustment of a total personality. Only when an individual can develop the compensatory faculties necessary to balance the physiological damage can the best results from the use of lipreading be expected.

At present, the teaching of lipreading proceeds according to six principal methods whose dissimilarities depend mainly on the degree to which contextual material is being used, and whether the approach is more by analysis or by synthesis.

Many states maintain lipreading classes in public schools, serving adults as well as children.[8] Classes are also provided by some of the local chapters of the American Society for the Hard of Hearing; furthermore, correspondence courses are available, either through the American Society for the Hard of Hearing or through private institutions, such as the work that is being carried on by Mrs. Harriet A. Montague at the John Tracy School at Los Angeles.[77] The American Society for the Hard of Hearing also maintains a correspondence club for its members.

The preceding brief summary of the possibilities and limitations inherent in the use of lipreading — based on the experience of the foremost workers in the field — may now permit to analyze more closely the place of lipreading within the framework of otological therapy. Here again, the approach will have to vary with the individual case, but it may be possible to state at least a small number of guiding principles.

In the light of expert opinion, lipreading should be instituted in all cases of chronic hearing impairment, as soon as preliminary diagnosis has ascertained the presence of a considerable hearing loss, or the progressive character of the disease. If started at this time, rehabilitation will produce cumulative benefit. Before the patient makes up his mind to consult an otologist, he must have observed that his hearing is not functioning satisfactorily; yet it is unlikely that he

should be convinced at this stage that he has been stricken by an irreversible disease. It is during the first visit that the physician may either unwittingly subject the patient to a severe psychological shock, or guide him in an intelligent approach to his problem, however grave the physical findings may be. The entire future course of rehabilitation depends on the psychological skill of the physician whose duty it is to lay the foundation for a positive solution of the problem.

Evidently, once the patient becomes aware of the seriousness of his condition — the realization that his diminishing hearing is not only a temporary disturbance will alarm anyone — he will not be satisfied or appeased by kind words and sympathy.[18] What he needs in this moment of crisis is guidance and advice by someone whose experience enables him to meet a near-catastrophe of this kind — a man whom he can trust and who will not abandon him in his struggle for the readjustment of his life. It is at this juncture that the physician's comprehensive knowledge of all possibilities and aspects of rehabilitation is of great service to his patient. The otologist will stress the fact that help is possible in each case, even though medical therapy might prove unable to reverse or even only to arrest the disease process. This calm assurance which will convey hope and confidence to the deafened person is based on a thorough knowledge of the means of rehabilitation, among which lipreading holds the first place.

While a hearing aid should never be prescribed before the termination of otological therapy, lipreading instruction can and should be started immediately. In this manner, the patient will be able to experience for himself that adequate means of communication can be brought into play, even after partial or total loss of hearing, and once he starts the course in lipreading, he will realize that instead of being condemned to a state of helpless contemplation of his fate, he can come to an active adjustment to the changed conditions of his life.

A busy otologist would not be able to carry through the entire rehabilitation program singlehanded, but he can tell his patient immediately of the help available to him through

lipreading instruction, and the office nurse can give the patient all the necessary detailed information. She can make his first appointment with the local chapter of the American Society for the Hard of Hearing, or with any other institution where he can begin the study of lipreading that very same week. Or, if no instruction should be available locally, the nurse can make all preliminary arrangements for a correspondence course. In this case, it might be the doctor's nurse who will have to give the first few lessons, or advise the patient's family or friends how to cooperate in making such a correspondence course a success. In any case, the nurse — if not the doctor himself — will have to make sure that the patient follows medical advice, and will possibly also have to check on his progress during the first few decisive weeks.

In this manner, comparatively little of the otologist's time will be required in order to start the patient on his way to rehabilitation, and yet, the effect of such a procedure on the progress of therapy will prove to be remarkable. On the one hand, rehabilitation cannot fail to have a positive influence on the patient's psychology. As hearing functions better in a balanced state of mind than in emotional dejection, examination will produce more reliable data in a calm patient and it will, therefore, be possible to check the progress of treatment much more accurately; furthermore, if lipreading has been started early, it will be possible to finish the course of treatment unhurriedly and free from the fear of potential psychological complications, as they might easily ensue if rehabilitation is instituted only after termination of otological therapy.

Lipreading instruction, like every other kind of rehabilitation of the acoustically handicapped, constitutes a border line problem of otology. As such it can be completely disregarded by the physician or, worse, it can be treated negligently to the great detriment of patient and doctor alike. The inclusion of any kind of marginal problem, on the other hand, cannot fail to deepen the appreciation of the entire issue in question. Deafness in all its complexity, therefore, cannot be adequately

understood as long as its psychological, educational and social implications are divorced from the medical, surgical and physical aspects.

The most advanced thought on the subject points clearly to the combination of medical and rehabilitational therapies in the aural clinics of the future, but as long as their number is insufficient the practicing otologist must shoulder the responsibility for initiating rehabilitation, which will logically have to start with lipreading instruction. In this way he will not only perform his duty toward his patients but will also prepare the way for complete coordination of medical and rehabitational therapies in specialized hearing clinics.

## SUMMARY.

1. Lipreading for the deaf and hard of hearing is an integral part of otologic therapy.
2. Lipreading instruction should be the first step in a program of rehabilitation for the acoustically handicapped.
3. As coordinated therapy and rehabilitation is provided by only a small number of hearing clinics, it remains for the practicing otologist to refer the patient to a competent lipreading instructor or school.
4. Lipreading must be regarded as an auxiliary branch of otology; as all expert details can be entrusted to skilled technicians, supervision of the patient's first steps in lipreading can be incorporated into the private otological practice.
5. Lipreading instruction is indicated in all cases of chronic or progressive acoustic impairment, entailing a considerable hearing loss within the speech range.
6. If lipreading instruction is started immediately after establishment of diagnosis, it will prove beneficial to the patient's psychology as well as to the progress of medical therapy. Whenever possible, lipreading should be started early in preschool age.

7. Ten years of literature on lipreading are reviewed and analyzed.

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# EARLY REPLACEMENT OF CARTILAGE FOLLOWING SEPTAL ABSCESS.*

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On reviewing the literature, one is surprised to find that no one has attempted early replacement of the septal cartilage following its total destruction by an abscess. This may be due to the fact that a sufficient number of cases to stimulate interest in this work have not been seen by any one individual. In the past, most otolaryngologists have been content to incise and drain the abscess and leave the correction of the resulting deformity to the plastic surgeon. If the destroyed cartilage is successfully replaced, saddle deformity may be prevented. In this paper, there will be presented one case of abscess of the nasal septum in which the saddling of the nose was probably prevented by early replacement of the septal cartilage.

Before proceeding further, it is pertinent to discuss a few facts concerning the etiology, frequency and treatment of abscess of the nasal septum.

*Etiology:* Many etiological factors of abscess of the nasal septum have been given, but the following list made by Beck[1] seems to be most comprehensive:

1. Nasal trauma.
2. Endonasal operation.
3. Inflammatory condition of the nose and its soft parts (furuncles, erysipelas, suppuration of accessory cavities).
4. Abscess of dental origin.
5. General infections such as grippe, typhus, scarlet fever, sepsis, variola and measles.

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6. The so-called idiopathic abscess, a classification not accepted by some authors.

*Frequency:* Multiple statistics are given for the frequency of abscess of the nasal septum. Beck[1] states that in a large clinic one might not see more than three or four cases in a year. In 1924, Yerger[2] reported an incidence of one septal abscess to every 526 cases of nasal disease. In 1929, Rosenberger[3] reported one septal abscess in every 3,000 cases of nasal disease. At St. Luke's Hospital, Cleveland, Ohio, there have been four septal abscesses in the last 11,239 admissions on the Ear, Nose and Throat Service. With the use of sulfonamides and antibiotics the incidence of septal abscess will certainly be much less than in the past.

*Treatment*: In the treatment of abscess of the nasal septum, all authors agree on incision and drainage. Lederer[4] recommends incision, irrigation of the cavity with hydrogen peroxide, followed by some alkaline antiseptic. Voorhees[5] recommends incision, irrigation, and treatment of the cavity with pure phenol, followed by 95 per cent alcohol. Ballenger's[6] textbook recommends free incision, sulfonamides and/or penicillin. Kernan[7] recommends incision, followed by removal of a piece of mucosa to obviate the necessity for using a drain, although a small piece of rubber may be inserted for 24 hours. The cavity should be cleansed by suction or irrigation daily. In 1944, Weille and DeBlois[8] published a method in which they used a T-shaped rubber tube for drainage of the abscess cavity.

For years it has been agreed that an abscess of the nasal septum with total destruction of the septal cartilage is generally followed by saddling of the nose. There are two schools of thought as to just why saddling of the nose occurs when the septal cartilage is removed. The first school, which comprises most surgeons, attributes the saddling to loss of support furnished by the nasal septum. This concept has been challenged by a second school. Fomon,[9] the chief advocate of the second school, states that, "Under static conditions the

septum is merely a redundant member offering no support whatever; that it functions only as a reserve safety factor when external crushing forces or internal tension stresses disturb or distort its equilibrium." He states further that the saddling of the nose following a submucous septal resection

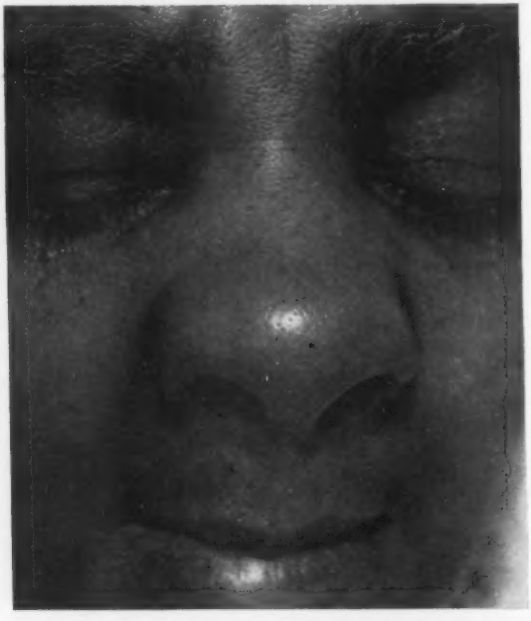

Fig. 1. Dorsum of nose markedly swollen on admission to the hospital.

too near the dorsum is not due to the lack of septal support but due to development of internal stresses arising from cicatrization of the deskeletonized connective tissue. In favor of this theory, he offers the fact that saddling which occurs after an extensive septal resection in this location usually occurs not immediately after the operation but some weeks later. The saddling should occur immediately if the septum was the supporting element.

At St. Luke's Hospital, Cleveland, Ohio, many extensive submucous resections have been performed and saddling prevented by reinsertion of autogenous or isografts of nasal septal cartilage which have been preserved in a solution of aqueous merthiolate. It cannot be definitely stated whether the absence of saddling of the nose in these cases is due to the graft of septal cartilage giving support or whether the

Fig. 2. Complete obstruction of both nares by bulging septal abscess.

internal stresses arising from cicatrization are prevented as described by Fomon.[9] On the basis of this work, it is the impression of this author that saddling of the nose following septal abscess can be prevented if the destroyed septal cartilage is successfully replaced. For a cartilage transplant to be successful following a septal abscess, the localized infection of the nasal septum should be controlled. The infection can be controlled in most cases by the use of the sulfonamides and

antibiotics. In the following case report will be described an instance in which saddling of the nose was prevented by an early successful replacement of the septal cartilage.

## CASE REPORT.

On admission to the hospital, a 64-year-old colored female gave a history of having had a head cold for the previous two weeks. During this

Fig. 3. Lateral view of nose three months after isograft of septal cartilage.

period she had noticed increasing pain and swelling on the dorsum of the nose along with nasal obstruction. The nasal obstruction became complete and the sense of smell was lost. There was no history of trauma or infectious diseases.

Physical examination revealed the dorsum of the nose to be greatly swollen and painful to palpation (see Fig. 1). There was bilateral obstruction of both nares by a fluctuant mass (see Fig. 2). The mass was covered by thickened red septal mucous membrane. There was no disease of the nasal sinuses. The rest of the physical examination was

essentially normal. The blood count showed a moderate anemia. Blood serology was negative. A culture of the septal abscess showed nonhemolytic staphylococcus aureus.

Penicillin was started on admission in a dosage of 20,000 units I.M. every three hours and continued until discharge from hospital. On the day of admission, the left side of the nasal septum was incised and approximately 30 cc. of pus and several pieces of necrotic cartilage aspirated. The mucoperichondrial flaps were greatly thickened. The entire nasal septal cartilage was found to be destroyed. Edges of the vomer and perpendicular plate of the ethmoid were visible through the abscess

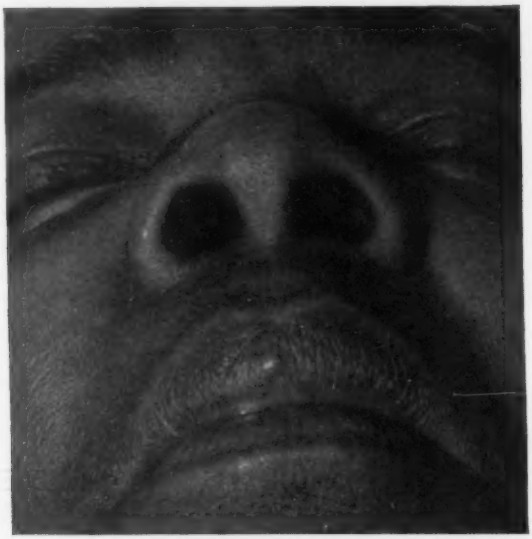

Fig. 4. Normal appearing nasal septum three months after isograft of septal cartilage.

cavity but did not seem to be involved in the infectious process. A small piece of thin rubber was placed in the incision to act as a drain and also to hold the mucoperichondrial flaps apart. The rubber drain was changed daily for the next two days and the area between the mucoperichondrial flaps irrigated with a solution containing 5,000 units of penicillin per cc. On the third day, granulation tissue covered the inner surface of the mucoperichondrial flaps, and there was an absence of pus. The granulations were removed with a sharp periosteal elevator and the cavity again irrigated with a solution containing 5,000 units of penicillin per cc. A small amount of bleeding occurred when the granulation tissue was removed and was controlled by application of bovine thrombin.

After the granulation tissue was removed and the bleeding controlled, an isograft of nasal septal cartilage measuring 2.0 x 2.5 cm. was placed between the mucoperichondrial flaps and held in place by a 4-0 chromic catgut suture that passed through the mucoperichondrial flaps and cartilage. A rubber drain, which was placed in each side of the nose to hold the flaps against the cartilage graft, was removed at the end of 24 hours. The swelling and tenderness over the dorsum of the nose rapidly disappeared and by the eighth day following the cartilage implant the patient was again breathing well through each naris. Following discharge from the hospital she was seen in the Out-Patient Clinic at frequent intervals. Three months after the cartilage implant there was no saddle deformity of the nose (see Fig. 3). The septum appeared to be of normal thickness and firmness (see Fig. 4).

*Summary*: The subject of saddle nose following abscess of the nasal septum has been reviewed. A case is reported in which a saddle deformity did not occur following complete destruction of the septal cartilage by an abscess. It is believed that the saddle deformity was prevented by an early successful isograft of septal cartilage. While a cartilage graft may not prevent a saddle deformity in all cases, it is of great interest that the graft was successful in an infected field. The method described in this paper is presented for further consideration and trial.

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# THE EMOTIONAL FACTOR IN TINNITUS AURIUM.*

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The word "emotional" is variously interpreted. According to the Standard dictionary "emotion" is a movement, stirring, perturbation, or excitement of mind; any act or state of excited feeling. The word emotion is used to embrace *1.* simple emotion or the transitory and superficial stirring of feeling without conscious reference to an object; *2.* affection, or feeling on connection with an object; *3.* desire involving craving for an object; and *4.* all of these combined.

The term "emotion" connotes physical feelings often visible, but more often invisible, to the observer. Psychologically, the different categories of emotion are much involved and variously stated. Emotion is ordinarily accompanied by sensations of pleasure or pain, sensuousness or rationality. If rational, emotions may be personal or impersonal. The emotions furnish the springs of action and the brakes of repression for man in his rational as well as in his irrational activities. They are accentuated when basic instincts or desires are blocked or thwarted by environment, internal or external.

It is stated that in infants there are but three emotions — love, fear and rage. This is an over-simplification. (Why not pleasure, discomfort, satisfied appetite, etc., etc.?) Emotional disturbances may exaggerate symptoms, not only because of distress in the organ primarily affected but also because of reactions set up in other tissues or organs of the body; however, if any symptoms of disease or threat of disease reaches the threshold of consciousness this symptom under unstable nervous states is prone to become a focus for emotional reference (a target for the day).

It has been stated that all emotions consist ultimately of

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sensations, conscious or subconscious; but it is possible that emotional disturbances in themselves and not necessarily the sensations they produce are the more important factors underlying many of the reactions produced. In other words, emotion may exist without sensation. We know that emotion may act in two ways: it may aggravate or it may obliterate a sensation.

In order to distinguish it from the purely cortical function which gives a cognitive clarity and discrimination to our sensations, a function probably mediated through the thalamus, emotion has been called "feeling tone" — that physiological process which gives "warmth" and "color" to sensations.

It is evident that it is impossible to give an entirely satisfactory definition to anything as subjective as emotion, and yet I can think of no better term for the reactions directly and indirectly implicated in the etiology, timing and exaggeration of many forms of tinnitus.

The ear is an organ of importance for expression. Without hearing, it is difficult to express our reactions, to know what is going on, to know what people are saying. The hearing is particularly susceptible to emotional disturbances, not only in its acuity, but in its illusions, such as tinnitus, and false interpretations of speech sounds.

The incidence of tinnitus, like the incidence of vertigo, varies greatly with age. It is uncommon in children except with hydrops of the labyrinth or after certain drugs, such as quinine, the salicylates, or any poison which causes irritation of the auditory labyrinth. In later life the incidence of tinnitus increases with episodes affecting the hearing and with the accumulation of stresses and fears and the increased instability which ensues with awareness or threat of disability or of frustrations. Both nonvibratory and vibratory tinnitus* may be influenced by the emotions, but herein we are dis-

*Some designate nonvibratory tinnitus as intrinsic, and vibratory tinnitus as extrinsic. It is thought that these terms are misleading because either may include tinnitus whose origin is within or without the ear.

cussing particularly nonvibratory tinnitus — tinnitus due to an illusion of sound.

The degree, type, time element, and bilaterality of sensory afflictions are important. In monaural suppurative otitis media there is less concern with losing the hearing than in binaural otitis, partly because one needs only one ear for hearing under ordinary conditions. There is usually no severe strain involved in social or business contacts unless under special circumstances, and, therefore, often little or no emotional reactions. The concern is with the suppuration. The patient goes to the otologist primarily for his running ear, not for his deafness.

In congenital, or early acquired, monaural nerve deafness also there is usually no major emotional upset, and tinnitus is seldom complained of before puberty. If nerve deafness, monaural or binaural, is acquired after childhood emotional reactions are more common and more complicated, depending largely upon the activity of the lesions, and tinnitus is the rule.

Peristent tinnitus is usually in the deafer ear, often even when the deafer ear seems to be totally deaf. Even in moderate binaural deafness, emotional factors are frequent, and tinnitus is often a major symptom, the symptom which in adults impels the patient to consult the otologist; but here, too, if the ear is discharging, it is the discharge pain discomfort, or deafness and seldom tinnitus which impels the patient to consult the otologist.

When there is a lesion causing irritation of the auditory nerve fibres, such irritation not only produces tinnitus but also deafness, because the fibres that are engaged in setting up the tinnitus are not available for the reception and transmisssion of nerve impulses occasioned by environmental sound. Thus whenever annoying tinnitus is present the hearing goes down and this increases the emotional stress and this in turn exaggerates the head noises and physiologically and psychologically makes it more difficult to concentrate, as well as to hear. Whenever the tinntus diminishes, the hearing is im-

proved, the patient feels better, functions better, and is under less strain. He is then relieved to some extent of his two annoying symptoms, his head noises and his deafness. This dual relief lessens the emotional strain and continues until something again sets up or accentuates his head noises.

Because of the frequency distribution of the auditory fibres in the cochlea it is reasonable to infer that tinnitus caused by irritation of limited areas of nerve fibrils here will result in more definite localized areas of irritation and more definite sounds (sometimes pure tones) than tinnitus originating in more central lesions, lesions affecting areas more closely packed and therefore affecting a wide spread of frequencies and causing an overall tinnitus and probably seldom a pure tone. I have repeatedly pointed out that this type of tinnitus is more difficult to mask.[1]

In some respects deafness does not lend itself as an escape mechanism as well as many other illnesses; it is not so obvious to the casual observer because the sufferer seldom exhibits any outward sign of disability. Usually he does not look or act sick. He cannot without effort convey his degree of suffering to the observer. In this way he is doubly frustrated; first, because of his inability to hear all he wishes to hear, and second, because of his inability adequately to use his deafness as an escape mechanism. To the casual observer he appears inattentive or stupid, or seems to be putting on an act; but make no mistake, his suffering may be genuine. If he attempts self-deception, as he frequently does, and denies deafness, his emotional instability is increased, the tinnitus, deafness and emotional reactions are exaggerated, and the strain is greater for all concerned.

In other words, the patient is frustrated not only because of his disability, but also because of his inability to arouse in others the consideration, sympathy and understanding which he craves. You will often hear him say, "Nobody has any idea how much I suffer; how terrible my head noises are." "I cannot concentrate; I cannot sleep; these terrible head noises are making me stone deaf."

Any severe loss of function in limb or a special sense sets up a trend to nonuse. In a leg it distorts or abolishes walking, in an ear it distorts or diminishes and sometimes even abolishes useful hearing. When listening is difficult, there is a drift into the habit of not listening. The opposite coordinate ear (or limb) is, therefore, at a disadvantage compared with bilateral functioning.

In many unstable patients tinnitus although really moderate in intensity may lead to hypochondria (escape through illness) or even to a state bordering on paranoia. The patient is obsessed with his terrible head noises. He may say and may believe that he is going crazy. He may have delusions of sound, the head noises being the basis thereof; a certain tune may be heard over and over again, or in some instances he may, as he puts it, "turn on any tune he wishes," day or night.

An approach to the management and treatment of tinnitus may be outlined as follows:

1. Offer no cure-all; there is none. All of the so-called "cures for tinnitus," drug and surgical, show no greater successes than occur without their use, unless the emotional factors are handled intelligently.
2. Obtain a careful personal and family history of all ear disorders and correlated episodes.
3. Obtain accurate information about the patient's medical and surgical history, particularly cardiovascular and neurological abnormalities. Consult his family doctor. Many disorders related to the tinnitus are not necessarily the primary cause thereof.
4. Tell the patient just what you propose to do and go about doing it in a quiet, thorough and understanding manner.
5. Make a complete otological examination, including nasopharyngoscopy.
6. Make an audiogram of hearing capacity (by air and bone conduction) in a soundproofed room.

7. Match or approximate the tinnitus in frequency and intensity, using discrete tones, thermal noise, or escaping air (using the non- or less tinnitus ear for this purpose when possible).

8. Measure the intensity of the tinnitus by deducing the db loss (in the opposite ear as shown by the threshold audiogram) from the intensity required to bring the matching sound in this ear up to the tinnitus loudness in the contralateral ear.

9. Tell the patient you have measured his head noises, and that as is usually the case, they are not really so loud as he thinks, or that they are really very faint, maybe fainter than a whisper, as the case may be. Tell him that they are not real noises at all but only an irritation of the nerve of hearing, which nerve, because it can only convey impulses to the brain to be sensed as sound, does just this, and so he senses an illusion of sound — not an hallucination — not a delusion. Not a disorder of his brain — only an irritation of the fibres of the nerve of hearing.

10. Measure the intensity of discrete frequencies and of overall sounds required to mask the tinnitus, applied first binaurally and then in each ear separately. Ask him if he hears his tinnitus when in a noisy place. The intensity required to mask out his tinnitus will give you information not only as to its loudness but also, I believe, as to its origin.[2]

11. Determine whether exercise or stooping make the tinnitus worse. Constrict the neck with a rubber band or tube, and then exert pressure on the jugular veins and subsequently upon one or both carotid arteries to determine whether this pressure increases or diminishes the tinnitus. In about 60 per cent of the cases such pressure will show reaction in the tinnitus. Frequently the cessation of the tinnitus is so dramatic that a favorable psychological effect ensues. Ascertain whether other

reactions increase or diminish the tinnitus, such as excitement, exercise, straining at stool, lying horizontally, etc. All of these procedures are designed to change the circulation in the vessels of the head. Several drugs, especially nitroglycerin, strychnine, atropine and epinephrine, may also be used to accomplish similar objectives. Oxygen inhalations may be of service. Keep in mind that anoxia is a fundamental cause of "nonvibratory tinnitus," whether it is due to or exaggerated by hydrops of the labyrinth, anemia, cardiovascular disease, inflammations, toxic poisons, blood, endocrine, dietary or emotional disorders, or disturbed metabolism from any cause. It has recently been shown by Knisley, Block, Eliot and Warner[3] how certain properties of the blood, its flow and vessel walls vary with specific stimuli and pathologic processes. Their investigations show how stasis occurs and remains complete sometimes for hours from tightly constricted capillaries and veins, and how stasis is accentuated by masses of blood cells (sludged blood) plugging the arteriole-capillary junction. The observations present strong evidence that "sludges" are implicated in the damage done by many diseases and disorders of man and beast. It is difficult to avoid the conclusion that "blood sludges," especially in conjunction with constriction of the arterioles, are implicated in certain types of tinnitus, and for that matter, often in vertigo, deafness, and a host of other symptoms heretofore not satisfactorily accounted for.

*12.* During your examination notice the patient's reactions, especially if he blanches or flushes easily, if his palms are abnormally moist, if there is a tremor in the extended fingers, if he is jumpy, picks his fingernails or fidgets. Study the patient as well as his ear disorder. Remember that people with psychosomatic disorders do not always manifest symptoms of emotional imbalance, and, on the other hand, do not assume that just because a patient is nervous he is neurotic. One symptom of neurosis is a distrust of the examiner. Suspect it if

at the end of your examination and advice he is dissatisfied, unconvinced or irritated; if he is not relieved when told that he is not going to lose his hearing, or that his head noises are not going to make him crazy.

Almost invariably you will be able to expose some reason in addition to the tinnitus for his nervous status. Commonly involved are the deafness and fears of bodily or mental illness, or actual past or impending difficulties in family, business or with acquaintances. In women, menstrual, pregnancy and menopause disorders often loom large in the emotional background, in both men and women, endocrine disorders, sickness, infidelity or other causes of dislocations in the home. The autonomic nervous system is thrown out of balance by disturbing environmental factors outside as well as inside the body.

Merely to say that a person is neurotic, neurasthenic or psychasthenic is unwise and may be unjustified. Complete information and especially adequate physical and laboratory studies may reveal an underlying blood disorder or thyroid, ovarian or other disease which accounts for the emotional symptoms. Avoid belittling symptoms because they are not little to the sufferer, but do not exaggerate. Excessive concern or excessive care of pains, aches or any symptom is bad for the patient.

It is most important to convince your patient that he should cease looking for "a miracle cure," and that unless he agrees to cease to do so and to cooperate, you will not accept him as your patient. Make this very clear to him and act accordingly.

Specific acting drugs, causing, accentuating or temporarily allaying tinnitus often aid in evaluating the emotional and other factors involved. Use them for diagnosis and as aids in treatment, not as "cures."[4]

Although emotion may not be the primary cause of a tinnitus, it is quite regularly a precipitating or aggravating factor. Anything which eases the emotional strain, anything which enables the patient to function better in the hearing

world, will in the great majority of instances lessen the annoyance from tinnitus, or remove it from the consciousness by making it subaudible. This is one of the reasons why properly chosen hearing aids and training in their tolerance and use is so valuable. They partially restore the hearing for sounds otherwise not heard, or heard with difficulty; they enable one to hear speech otherwise not heard; they aid in masking out tinnitus by magnifying all environmental noise. The fenestration operation, or for that matter any other operation (or even hypodermic injections of any of the drugs for so-called "restoration of the hearing" or "cures" for tinnitus) may at times succeed in diminishing tinnitus, not necessarily because of any direct effect upon the tinnitus but because of their effect upon the emotions. Contrariwise, when operations or purely medical treatment or "cures" fail, as they ultimately do in the majority of cases, if the emotional factors are ignored, the patient is often worse off than before. He still must wear his hearing aid, the dislike of which was his chief reason for submitting to operation or treatment. He has increased his sense of frustration. He has tried what he thinks was his last chance and failed. The emotional factors may be thus made even more difficult to manage, and now be even of more importance than before. On the other hand, failure sometimes jolts the patient out of wishful thinking, stabilizes his emotional reaction.

With time and patience the otologist in 90 per cent of instances can not only lessen or abolish the tinnitus, but also assist in rehabilitation by managing the acceptance of, and guidance in, the use of hearing aids and in training his patient to listen with whatever hearing remains. So-called "auditory training" is usually not even thought of, but it is invaluable and should never be neglected. These items are important adjuncts to other treatment and, moreover, keep the patient employed and interested during hours which otherwise might be given over to withdrawal from the world of sound, and to being very sorry for himself. In response to his questions as to his sanity, tell him that his head noises will

not make him any more crazy than he is anyway. When possible buck him up, and send him from your office laughing.

Your careful examination and explanations should engender in your patient a feeling of confidence, a feeling that you know something about tinnitus, that you have measured it, used it as a tool to obtain information and caused it to change in intensity or quality, or both; that you are willing to give time and effort to a study of his tinnitus if he will cooperate; that you are not one of those who says, "You have tinnitus, no one knows anything about it, you will have to grin and bear it" and so on *ad nauseam*. Remember, your patient has probably consulted several well known otologists before he came to you and is likely to be fed up with such treatment, and with useless haphazard or special "cures" for tinnitus. Perhaps you are his last resort; do not fail him.

Because tinnitus may result from many and different lesions of the ear mechanism, a differential diagnosis is imperative, but this alone is not sufficient. There is no scientific treatment for tinnitus which does not include recognition of the emotional factors involved. Both in apparently normal and in diseased ears emotion alone can be, and frequently is, a major factor in the etiology or excessive annoyance from tinnitus. If alone you are unable to cope with the emotional factors involved enlist the cooperation of a reliable and interested neurologist so that together you will be able to benefit your patient more than either of you alone.

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140 East 54th Street.

# CARBONATED SOFT DRINKS AS A CONTRAST MEDIUM FOR THE LOCALIZATION OF MAGNETIC FOREIGN BODIES IN THE ABDOMINAL VISCERAL CAVITY.*

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With the advent of the permanent endoscopic magnets, of Alnico metal,[1,2] it has become imperative that the Roentgen department differentiate, quickly and easily, between a magnetic foreign body in the stomach or one in the intestine. Obviously if the endoscopist is to be successful in the removal of these magnetic foreign bodies in the stomach, the differentiation by the Roentgen department must be done with some agent that will not interfere, to any great extent, with the following endoscopy and introduction of the magnet. The substance used must not present hazards to the patient, must not interfere with the endoscopist or tend to hasten the passage of the foreign body into the intestine. First, barium mixture, in the stomach, practically eliminates subsequent endoscopy and the introduction of the magnet for a period of several hours. Second, marked vomiting either under local or ether anesthesia with its accompanying dangers to the patient and interference with the whole procedure eliminates the use of barium mixture. Third, the heavy barium mixture, in a large percentage of cases, will carry the foreign body into the intestines, usually beyond the reach of the endoscopist.[6]

Obviously all three should be avoided if possible with some types of foreign bodies, such as nails, bobbette pins, and others with sharp points or edges. These frequently present serious hazards if passed into the intestine.[3,5,7] Some will pass

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through without complications.[4,5] Many, however, lodge and necessitate surgical removal.[5,7] A few will penetrate the intes-

Fig. 1. Anteroposterior view. Bobbette pin at interspace between second and third lumbar vertebrae. Patient two years old. (Gas in colon.)

tinal wall, such as open safety pins and large nails, the complications of which are not within the realm of this paper.

A large percentage of patients in which this type of for-

eign body is encountered are extremely young. In this laboratory we have had great difficulty, particularly in time consumed, in persuading these young patients to drink a barium

Fig. 2. Pin anterior. (Gas in colon.)

mixture. In most cases this is not accomplished regardless of time consumed.

Endoscopy with roentgenoscopic guidance, either triangula-

tion[8] or single plane, for the introduction of the magnet into the stomach and removal of a foreign body is subjecting the

Fig. 3. Anteroposterior view. Stomach visualized with liberated gas from one ounce of bottled soft drink. (Coca-Cola.)

patient to an unnecessary procedure and a waste of time for the entire staff unless the foreign body is proven to be in the stomach. This in spite of the fact that previous films, with-

out a contrast medium, seem to indicate that the foreign body is definitely in the stomach (see Figs. 1 and 2).

Fig. 4. Lateral view. Stomach outlined with liberated gas, taken immediately after Fig. 3.

The diagnosis of a foreign body in the stomach, in the case illustrated, was sent to us along with the patient. Our films seemed to substantiate the diagnosis. The pin is seen at the

level of the interspace between the second and third lumbar vertebrae in the anteroposterior film (see Fig. 1).

Because of the history of this foreign body (bobbette pin), being swallowed four days previously, some doubt about its being in the stomach was expressed by the Roentgen department. It was decided to do further roentgenographic studies to more accurately localize this foreign body so as to eliminate any needless endoscopic work.

During previous roentgenoscopic guidance for the removal of magnetic foreign bodies from the stomach the clarity of outline of the stomach was noticed after the introduction of air to balloon the stomach and free the foreign body from the mucous membrane folds. As a result of this observation, I decided to try some gas, other than air, rather than the usual barium mixture in localizing the foreign bodies previous to attempted removal. Air in the thoracic cavity and the colon is frequently used as a contrast medium.

The medium containing gas nearest at hand was a bottle of Coca-Cola. The young patients readily cooperate. In fact the greatest difficulty is taking the proffered carbonated drink from them after several healthy swallows. Usually after permitting the patient to drink an ounce or two, they are immediately placed on the roentgenographic table and films are made quickly in both anteroposterior and lateral positions using a very rapid technique (see Figs. 3 and 4). We have found that this small amount of any bottled carbonated drink liberates sufficient gas to outline the stomach, whereas more might cause eructation with loss of gas.

The use of this method of introducing gas into the stomach, in such small quantities, does not contraindicate subsequent endoscopy. It does not tend to facilitate passage of the foreign body into the intestine. The results have been so gratifying that the use of bottled carbonated soft drinks, as a contrast medium, to aid in localization of magnetic foreign

bodies in the abdominal visceral cavity is a standard procedure in this laboratory.

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## A NEW TONSIL SUTURE NEEDLE.

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The instrument herewith presented to the profession has been in constant personal use for over 10 years. In addition,

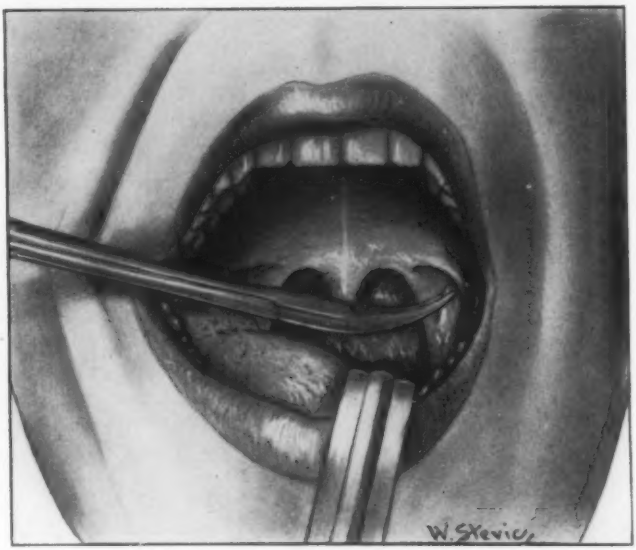

Fig. 1.

it has won a place in the armamentarium of not a few of our local surgeons. The distinguishing features of the instrument are as follows:

First, a large, heavy handle which fits well into the hand

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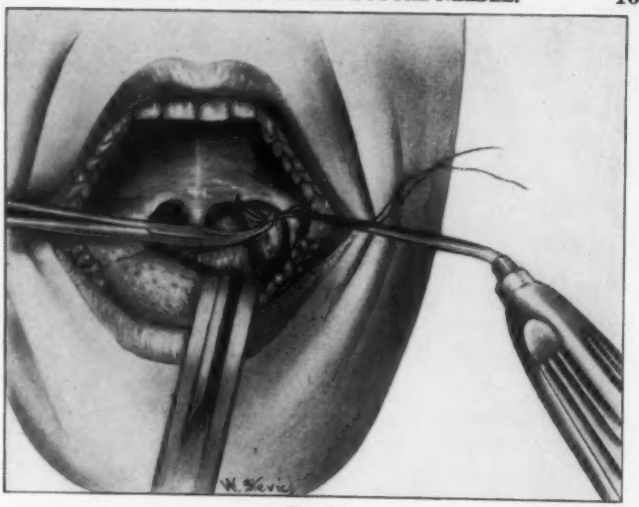

Fig. 2.

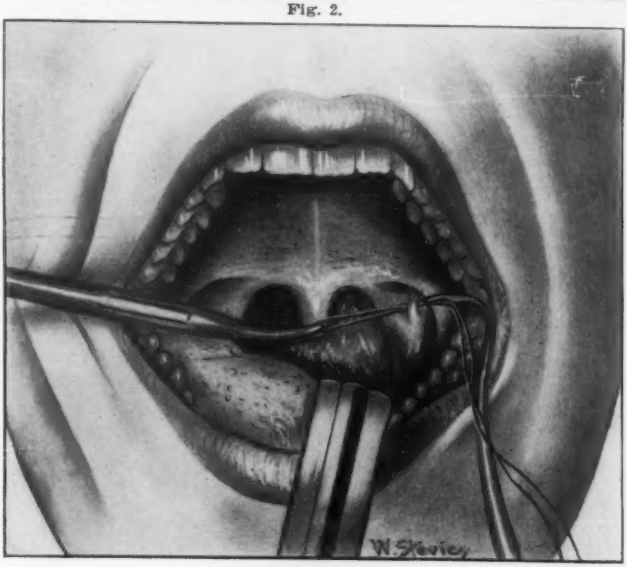

Fig. 3.

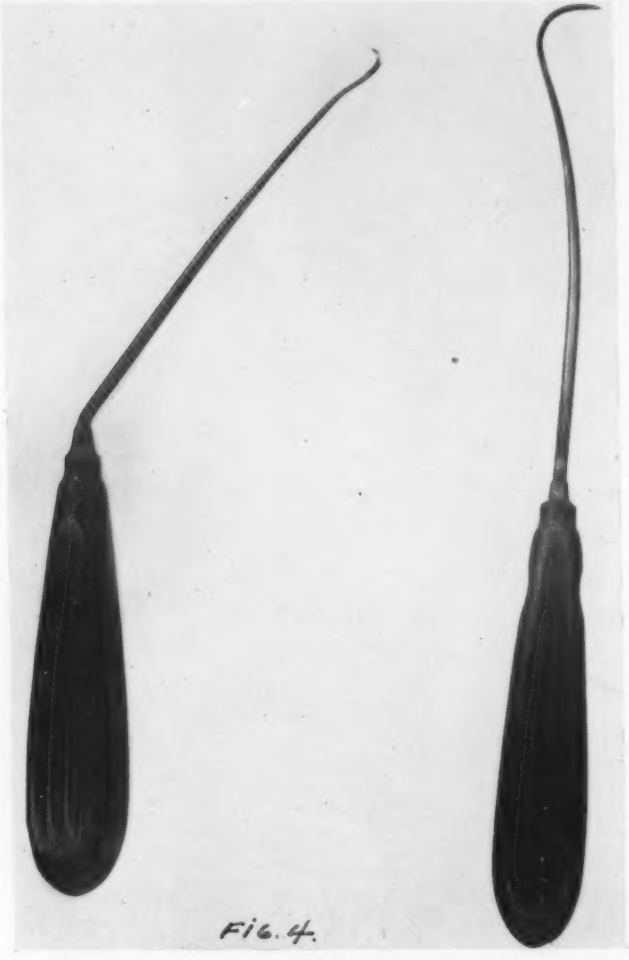


Fig. 4.
Manufactured by George Berbert & Sons, Denver, Colo.

and prevents slipping and rotating. Second, a double curve to the shank which enables the operator at all times to visualize the most important part of the instrument, the needle. Third, a flat, smooth needle with a large eyelet which is readily threaded.

The following technique has proven practical:

After the bleeding point has been seized with a fine pointed forceps (see Fig. 1), the threaded needle (No. 1 or No. 0 catgut) is passed through the tissues just beneath, until the ligature comes into view (see Fig. 2). The forceps is now removed from the bleeder and used to grasp the ligature (see Fig. 3).

Right and left needles are provided for the ambidextrous; however, many operators seem to get along with just the right-handed needle (see Fig. 4).

227 16th Street.

# NASAL SEPTAL ABSCESS SECONDARY TO INLYING DUODENAL TUBE. REPORT OF A CASE.*

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The frequency of abscess of the nasal septum is given by various writers to be one in every fifteen hundred or two thousand cases of nasal disease. The causes of septal abscess according to Kecht are as follows:

1. Nasal trauma.
2. Endonasal operation.
3. Inflammatory conditions of the nose and its soft parts, furuncles, erysipelas, suppuration of the accessory cavities.
4. Abscesses of dental origin.
5. General infections such as grippe, typhus, sepsis, variola, scarlet fever, measles.
6. Idiopathic.

A careful review of the literature on this subject has failed to reveal any similar case of septal abscess as herein reported.

## CASE REPORT.

A white female, age 56 years, was admitted to the hospital on May 1, 1947. Her chief complaint was difficulty in breathing of several weeks' duration and occasional headaches. On Feb. 18, 1947, she had undergone an operation for removal of an adenocarcinoma of the sigmoid, grade II malignancy. She made an uneventful recovery.

Examination of the nose revealed an almost complete obstruction of both nostrils from an enlargement of the nasal septum. A tentative diagnosis of a possible metastatic carcinoma of the nasal septum from the previous malignancy of the colon was made.

*Laboratory Findings:* Red blood cells, 4,600,000; hemoglobin, 94 per cent. The Wassermann test and urinalysis were negative. Roentgeno-

*Read at the Fiftieth Semiannual Convention, Montana Academy of Oto-Ophthalmology, Butte, Mont., Feb. 22, 1948.

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grams of the skull, sinuses and chest were within normal limits. A tuberculin patch test was negative.

*Treatment and Course:* A biopsy of the nasal mucosa was performed. The pathological report found no evidence of malignancy. A submucous resection was performed next, at which time an area of the nasal cartilage the size of a dime was found destroyed. Necrosis and granulation of the tissues were encountered. All the tissue was saved for pathological study. The report was as follows: There are overlying irregular layers of cartilage above which there is much fibrous granulation tissue and extensive pyogenic granuloma. No evidence of any malignancy was found.

The diagnosis of septal abscess was then made, the etiology of which was undetermined. A review of the patient's hospital record revealed that, following her operation for carcinoma of the colon, she had received an inlying duodenal tube for five days, during which time the tube was removed and reinserted three separate times. In the nurse's notes was the following statement: "Patient complains of pain in the nostril from the Wangensteen tube."

## COMMENT.

Hirschfeld studied 3,489 cases of septal abscess and found that in about 75 per cent it was secondary to trauma. Wangensteen replied in regard to this case: "I think it altogether likely that your patient may have suffered a septal abscess from the inlying duodenal tube." Rosenberger said, in commenting on this case: "I can imagine that the trauma incident to the introduction and presence of this tube might conceivably result in infection and resulting septal abscess. One pathway of infection could be direct irritation and rupture of the mucoperichondrium with resulting chondritis and septal abscess. Another avenue of infection was suggested in my article in the *Ohio State Medical Journal* of June, 1929." According to Rosenberger, it is quite possible, theoretically, that an isolated inflammation in the vomeronasal organ or organ of Jacobson could result in a septal abscess.

Carter and Yerger are of the opinion that a septal abscess may result from an injury causing fracture of the bony or cartilaginous septum and subsequent infection by pyogenic bacteria through the injured mucoperiosteum or mucoperichondrium. Carter believes that infection may occur through the blood stream in cases of septal abscess following trauma without fracture. Septal abscess of traumatic origin are generally believed to follow infected intraseptal hematoma.

The diagnosis of nasal septal abscess is usually readily made from the history and symptoms of progressive bilateral nasal obstruction due to a greatly thickened and boggy septum which fails to shrink with the use of vasoconstrictors. The patient's recent history of malignancy and the comparatively long duration of the nasal septal abscess made it difficult at first to arrive at the correct diagnosis.

## SUMMARY.

1. A case of nasal septal abscess secondary to inlying duodenal tube is reported.

2. A careful review of the literature failed to reveal any similar case report.

3. The final diagnosis was arrived at only after careful study of the patient's previous history and findings.

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## DR. GEORGE M. COATES HONORED.

The American Otorhinologic Society for the Advancement of Plastic and Reconstructive Surgery held a scientific meeting in Atlantic City, Wednesday, June 11, 1947.

The meeting was preceded by a dinner at the Hotel Mayflower given in honor of Dr. George M. Coates, to whom a life-size bronze bust was presented under the auspices of the American Otorhinologic Society for the Advancement of Plastic and Reconstructive Surgery and the Fomon Group.

Guests of honor were: Dr. and Mrs. George M. Coates, Miss Elizabeth Coates, Dr. John McKenzie Brown, Dr. Francis W. White, Dr. Julius Lempert.

Dr. Samuel Fomon made the official presentation of the bust to Dr. George M. Coates.

"We are all here to honor Dr. Coates. The sculptor has performed his task admirably, but after all, this bust is just a thing of art, made of bronze, and we who have the privilege of knowing Dr. Coates realize that no artist, however brilliant, could possibly portray the many qualities that endear him to us. As scientists, we have been trained to ponder cause and effect, and it is natural that one is led to wonder on what foundation lies the broad structure of his fame. How has this man so impressed himself on the medical world as to be elevated to the position he occupies? Why is his presence at any gathering a source of inspiration? To those who know him, the reasons are evident; for no one can fail to recognize in Dr. Coates the rare combination of a wise and able leader with an inflexible conscience which induces him to fearless action when he feels the cause he sponsors is right, yet found by all, despite his greatness, to be the most tolerant and approachable of men.

"His lovable simplicity and innate modesty, his unimpeachable sincerity and deep wisdom that runs through all he says

and does have given him a peculiar ascendency in medical confidence and made him the outstanding figure he is. It occurs to me that his influence is so strong and powerful that it cannot be evaluated at this time.

"It was largely his militant leadership and his devotion to education that made otolaryngologic plastic surgery acceptable. He has been a godfather to this Society, for which we owe him much; with his fertile counsel we cannot fail.

"For my own part, my feelings are too deep to be adequately expressed in words. What little distinction I have attained I owe to his sympathetic interest and encouragement. Without his influence our school would never have acquired that galaxy of splendid men who are found on the roll of our alumni.

"I thank the President for the privilege of expressing my respects to our beloved mentor, Dr. Coates."

## BOOK REVIEW.

**Endotracheal Anesthesia.** Second Edition. By Dr. Noel A. Gillespie, University of Wisconsin Press.

This is an excellent account of endotracheal anesthesia, presented in a manner which makes this book a "must" for students of anesthesiology. To those otolaryngologists fortunate enough to have an M.D. anesthetist working with them, the perusal of this book will give a clearer understanding of the problems of the anesthetist with resulting harmony in the operating room. A careful reading will help other otolaryngologists to give intelligent suggestions and help to their nurse anesthetists. The book is well illustrated, has an excellent bibliography and is well written. It is recommended not only as informative but also as delightful reading.

## AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION.

The Twenty-ninth Annual Meeting of the American Broncho-Esophagological Association will be held in Atlantic City at the Chalfonte-Haddon Hall on the afternoons of April 7 and 8, 1948. The program follows:

Bronchial Adenomas—Dr. Louis H. Clerf, Philadelphia, Pa.

Fibrocystic Disease of the Pancreas, and Its Relation to Pulmonary Suppuration—Dr. Joseph P. Atkins, Philadelphia, Pa.

Bronchoscopic Examinations in the Newborn — Dr. Clyde Heatly, Rochester, N. Y.

Tracheal and Bronchial Obstruction Due to Cardiovascular Anomalies—Dr. Paul H. Holinger, Chicago, Ill.

Bronchospirography—Dr. Charles Norris, Philadelphia, Pa.

Histal Hernia of the Esophagus—Dr. F. Johnson Putney, Philadelphia, Pa.

Syphilitic Tumor of the Bronchus—Dr. Archibald R. Judd, Hamberg, Pa.

The Present Status of Broncho-Esophagology in Latin America—Dr. C. L. Jackson, Philadelphia, Pa.

Reconstruction Surgery of the Trachea—Dr. Longmire, Baltimore, Md.

Streptomycin Therapy in Tracheal and Bronchial Tuberculosis—Dr. John J. O'Keefe, Philadelphia, Pa.

Rhinoscleroma of the Bronchus—Dr. Ricardo Tapia, Mexico City, Mexico.

Allergic Manifestations of Pulmonary Disease—Dr. Francis W. Davison, Geisinger Memorial Hospital, Danville, Pa.

Hemoptysis Due to Chronic Mediastinal Venous Obstruction—Dr. Stanton A. Friedberg, Chicago, Ill.

Granuloma of the Larynx Due to Intratracheal Anesthesia—Dr. Frederick T. Hill, Waterville, Me.

Address inquiries to Dr. Paul H. Holinger, 700 North Michigan Avenue, Chicago, Ill.

## INTERNATIONAL SURGICAL ASSEMBLY.

The Sixth International Assembly of the International College of Surgeons will be held in Rome, Italy, at the invitation of the Italian Government, during the week of May 16-23, 1948, under the presidency of Prof. Raffaele Bastianelli and Prof. Raffaele Paolucci, of Rome, and Prof. Mario Dogliotti, of Turin. The secretary of the Assembly is Prof. Giuseppe Bendandi, of Rome. Attendance is not limited to the membership of the College; all surgeons in good standing in their medical organizations are invited. Scientific meetings, scientific and commercial exhibits, visits to the Universities of Turin and Milan have been arranged, together with tours to other medical centers in Europe. A special exhibit of ancient texts on surgery is being arranged by Prof. Davide Giordano, of Venice, honorary president, under the active presidency of Prof. Adalberto Pazzini, professor of history at the University of Rome. This extraordinary exhibit dealing with ancient surgery will be on display in the Vallicelliana Library in one of the historical buildings of the Vatican. Detailed information may be obtained from Dr. Max Thorek, General Secretary, 850 Irving Park Road, Chicago 13. For travel information, address the All Nations Travel Bureau, 38 South Dearborn Street, Chicago, the official travel representatives for this Assembly. Those desiring to present scientific papers, address Dr. Karl Meyer, Cook County Hospital, Chicago; Dr. Henry W. Meyerding, Mayo Foundation, Rochester, Minn., or Dr. Herbert Acuff, Acuff Clinic, 514 West Church Street, Knoxville, Tenn. Those from Canada should direct their inquiries to Dr. Lyon Appleby, 925 W. Georgia Street, Vancouver, B. C.

## THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

Arrangements have been made to hold the Annual Meeting at Chalfonte-Haddon Hall in Atlantic City on April 7, 8 and 9, 1948. The mornings will be devoted to scientific sessions; the afternoons will be left free.

The American Otological Society and the American Laryngological Association are planning to hold their meetings at Old Homestead, Va.—the former on April 12 and 13, 1948; the latter on April 14 and 15, 1948.

This plan to have a three-day Triological meeting with free afternoons and an interval of two days between the Atlantic City and the Old Homestead meetings is projected in order to relieve the strain of concentrating within one week the combined activities of these three societies. Address any inquiries to Dr. C. Stewart Nash, Secretary.

## HEARING AIDS ACCEPTED BY THE COUNCIL ON PHYSICAL MEDICINE OF THE AMERICAN MEDICAL ASSOCIATION.

Aurex (Semi-Portable); Aurex Model C-B, Model C-A, Model F and Model H.

Manufacturer: Aurex Corp., 1117 N. Franklin St., Chicago, Ill.

Beltone Mono-Pac; Beltone Harmony Mono-Pac.

Manufacturer: Beltone Hearing Aid Co., 1450 W. 19th St., Chicago, Ill.

Electroear Model C.

Manufacturer: American Earphone Co., Inc., 10 East 43rd St., New York 17, N. Y.

Maico Type K; Maico Atomeer.

Manufacturer: Maico Co., Inc., North Third St., Minneapolis, Minn.

Mears Aurophone Model 98.

Manufacturer: Mears Radio Hearing Device Corp., 1 W. 34th St., New York, N. Y.

Microtone T-4 Audiomatic.

Manufacturer: The Microtone Co., 4602 Nicollet Ave., Minneapolis, Minn.

Otarion Model A-1; Otarion Model A-2; Otarion Model A-3; Otarion Models A-4 J and D; Otarion Model E-1.

Manufacturer: Otarion Hearing Aids, 448 N. Wells St., Chicago, Ill.

Paravox Models VV2 and VV3; Paravox Models VH and VL; Paravox Model XT; Paravox Model XTS.

Manufacturer: Paraphone Hearing Aid, Inc., 2056 E. 4th St., Cleveland, Ohio.

Radioear Masterpiece; Radioear 45-CM; Radioear Model 45-M-magnetic air conduction receiver; Radioear Model 45-M-magnetic bone conduction receiver.

Manufacturer: E. A. Myers & Sons, 306 Beverly Rd., Mt. Lebanon, Pittsburgh, Pa.

Ravox (Semi-Portable).

Manufacturer: Zenith Radio Corp., 6001 W. Dickens Ave., Chicago, Ill.

**Silver Micronic Hearing Aid.**

Manufacturer: Micronic Corp., 101 Tremont St., Boston 8, Mass.

**Solopak Hearing Aids.**

Manufacturer: Allen-Howe Electronics Corp., 150 Main St., Peabody, Mass.

**Sonotone Audicles No. 530, No. 531 and No. 533; Sonotone Model 600; Sonotone Model 700.**

Manufacturer: Sonotone Corp., Elmsford, N. Y.

**Telex Model 22; Telex Model 612; Telex Model 900; Telex Model 1020; Telex Model 1550.**

Manufacturer: Telex, Inc., Minneapolis 1, Minn.

**Trimm Vacuum Tube No. 300.**

Manufacturer: Trimm, Inc., 400 W. Lake St., Libertyville, Ill.

**Unex Model "A."**

Manufacturer: Nichols & Clark, Hathorne, Mass.

**Vacolite Model D.**

Manufacturer: Vacolite Co., 3003 N. Henderson, Dallas, Tex.

**Vactuphone Hearing Aid.**

Manufacturer: Allen-Howe Electronics Corp., 150 Main St., Peabody, Mass.

**Western Electric Audiophone Ortho-technic Model; Western Electric Telephone Type Audiophone Model J-1; Western Electric Model 63; Western Electric Model 64; Western Electric Models 6S and U.**

Manufacturer: Western Electric Co., Inc., 300 Central Ave., Kearny, N. J.

**Zenith Radionic Model A-2-A; Zenith Radionic Model A-3-A; Zenith Radionic Model B-3-A; Zenith Model 75.**

Manufacturer: Zenith Radio Corp., 6001 Dickens Ave., Chicago, Ill.

# DIRECTORY OF NATIONAL OTOLARYNGOLOGIC SOCIETIES.

## AMERICAN OTOLOGICAL SOCIETY.

President: Dr. Bernard J. McMahon, 806 Missouri Theatre Bldg., St. Louis 3, Mo.
Secretary: Dr. Gordon D. Hoople, Medical Arts Bldg., Syracuse 3, N. Y.
Meeting: Hot Springs, Va., The Homestead, April 12-13, 1948.

## AMERICAN LARYNGOLOGICAL ASSOCIATION.

President: Dr. Arthur W. Proetz, Beaumont Bldg., St. Louis 8, Mo.
Secretary: Louis H. Clerf, 1530 Locust St., Philadelphia 2, Pa.
Meeting: Hot Springs, Va., The Homestead, April 14-15, 1948.

## AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

President: Dr. Lyman G. Richards, 15 Whiting Road, Wellesley Hills, Mass.
Secretary: Dr. C. Stewart Nash, 708 Medical Arts Building, Rochester, N. Y.
Meeting: Atlantic City, N. J., Chalfonte-Haddon Hall, April 7-9, 1948.

## AMERICAN MEDICAL ASSOCIATION, SECTION ON LARYNGOLOGY, OTOLOGY AND RHINOLOGY.

Chairman: Dr. Fletcher D. Woodward, 104 E. Market St., Charlottesville, Va.
Secretary: Dr. James M. Robb, 641 David Whitney Bldg., Detroit, Mich.
Meeting: Chicago, Ill., June 21-25, 1948.

## AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

President: Dr. Carl H. McCaskey, 608 Title Guaranty Bldg., Indianapolis 4, Ind.
President-Elect: Dr. Conrad Berens, 35 E. 70th St., New York, N. Y.
Executive Secretary: Dr. William L. Benedict, Mayo Clinic, Rochester, Minn.
Meeting: Chicago, Ill., Palmer House, Oct. 10-15, 1948.

## AMERICAN SOCIETY OF OPHTHALMOLOGIC AND OTOLARYNGOLOGIC ALLERGY

President: Dr. W. Byron Black, 530 Professional Bldg., Kansas City, Mo.
Secretary-Treasurer: Dr. Francis L. McGannon, 14900 Detroit Ave., Lakewood, Ohio.
Meeting: Chicago, Ill., Palmer House, Oct. 8-9, 1948.

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